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MANUAL

for

FOREST FIRE

CONTROL

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Fire Organization

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MANUAL

FOR

FOREST FIRE CONTROL ;

ORGANIZATION //

This Reference Manual is a digest of the teaching material presented at the three winter training sessions of the Northeastern Forest Fire Protection Commission. It is designed for the use of forest fire control officers. Additional copies may be obtained for \$1.50 postpaid from the Northeastern Forest Fire Protection Commission, Patlen Building, Chatham, N. Y.

Northeastern Forest Fire
Protection Commission

xv
Region 7,
U. S. Forest Service



FOREWORD

The Northeastern Forest Fire Protection Commission is an unprecedented arrangement under which the affiliated member states, with the cooperation of the United States Forest Service, have joined in a united effort to prevent and control forest fires.

The objectives of the Commission are attained through the development of integrated forest fire plans, by the maintenance of adequate forest fire fighting services, by providing for mutual aid in fire suppression, and by the establishment of a central executive office to plan and coordinate the services of the Commission.

This reference manual has been prepared as a cooperative undertaking by the Commission and the U. S. Forest Service, Region 7, as provided in Article VI of the Enabling Interstate Compact.

The purpose of the Manual is to provide a common reference for fire organization and a basis for training overhead personnel. It is designed to secure coordinated operations in interstate mutual aid fire suppression activities.

Regional Forester, R-7,
U. S. Forest Service

Executive Secretary
Northeastern Forest
Fire Protection
Compact

THE FIRE ORGANIZATION

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THE FIRE ORGANIZATION

ORGANIZING THE FIRE JOB

Organization

Organization has been defined as "the act of bringing parts into a systematic relation to the whole".

Good Organization:

1. Provides for a coordination of action.
2. Insures against duplication of effort.
3. Eliminates conflicting activity.
4. Promotes team-work.
5. Insures that the task at hand is completed in a minimum of time and with a minimum of effort.

An example of good organization is presented by two experienced woodsmen using a cross-cut saw.

Organization Applied to the Suppression Job

Efficient forest fire suppression demands a maximum of accomplishment in a minimum of time utilizing the resources at hand. Experience has demonstrated that the attainment of these objectives is best assured if the suppression action adheres to the principles of good organization.

The work of suppressing a forest fire consists of a number of jobs. On a small fire all of these jobs may be handled efficiently by one man. As a campaign fire increases in magnitude and the suppression forces increase in number it becomes necessary to delegate more and more of these individual jobs to other people. The group of individuals handling these jobs comprise the Fire Organization.

Breakdown of the Suppression Job

The jobs which make up the task of handling the suppression of a forest fire fall into three general groups:

The Line Jobs

The Plans Jobs

The Service Jobs

The relation of these groups to each other and to the overall job of controlling the fire is illustrated by the following diagram:

responsibility for, the entire fire suppression project. That individual is called the Fire Boss.

To insure that the jobs within each of the three classes are well coordinated an organized unit is set up for each. These units are designated respectively as:

The Line Unit

The Plans Unit

The Service Unit

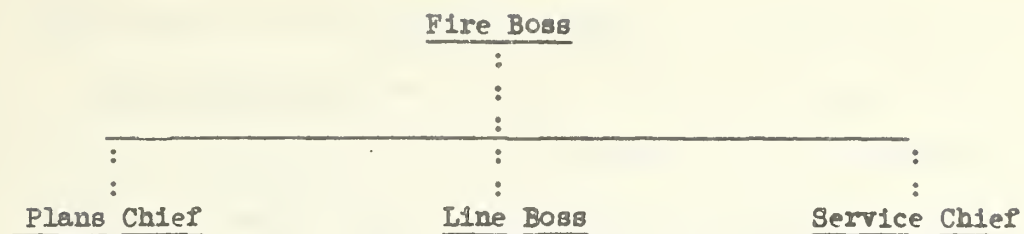
A Unit Chief is placed in charge of each Unit who has full authority over the Unit organization and who is fully responsible to the Fire Boss for the efficient operation of his Unit. These Unit Chiefs are designated respectively as:

The Line Boss

The Plans Chief

The Service Chief

The line of authority and responsibility, with relation to the Fire Boss and to each other, is illustrated by the diagram:



These three Unit Chiefs comprise the Top Staff or Board of Strategy of the Fire Boss. Under normal operating conditions the Fire Boss will handle all of the business of directing the Fire Organization through one or more of these Unit Chiefs.

S U M M A R Y

Fire Organization

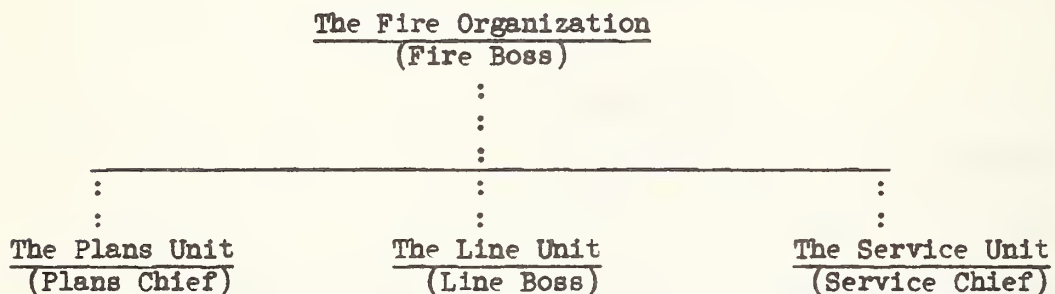
In summary the normal steps in organizing the fire suppression job are:

1. Designate a FIRE BOSS who is given full responsibility for handling the suppression job and complete authority over all personnel, equipment and other resources assigned to that job.
2. Divide the over-all suppression job into three general classes of jobs (Line - Plans - Service).
3. Organize suppression personnel into three Units, one for each of the job classes.
4. Designate a Chief for each Unit, responsible for the Organization, training and effective functioning of his Unit.

5. The entire group of personnel responsible for the supervision of the suppression project comprise the Fire Headquarters organization.

6. The entire suppression force (labor - supervision - technical personnel) assigned to the fire comprise the Fire Organization.

The relationship of these Units and individuals to each other and to the Fire Organization as a whole is illustrated by the following diagram:



The general function performed by each of these Units may be defined as:

1. The Line Unit is responsible for the job of actually attacking going fire on the ground and putting it out.
2. The Plans Unit is responsible for the collection, evaluation and distribution of all information pertaining to the fire and for the maintenance of a complete record of the suppression action.
3. The Service Unit is responsible for providing and maintaining all equipment, supplies and services required to maintain the Fire Organization.

THE FIRE JOBS

The Fire Organization is a well-organized team whose primary function is the prompt and efficient extinguishing of the fire to which it is applied.

THE FIRE BOSS

The Fire Boss is in full charge of the Fire Organization. He is fully responsible for all phases of the fire control project. His primary responsibility is the prompt organization and supervision of the resources placed at his disposal toward the efficient and complete control of the fire.

To enable the Fire Boss to discharge this responsibility he is given full authority over all elements of the fire control operation within the framework of legal statute and current policy statements.

One of the principal jobs of the Fire Boss is to make DECISIONS. He makes final decisions on:

1. All strategic and tactical plans.
2. All major changes in such plans.
3. The emergency use of off-shift personnel to meet unanticipated situations.

4. All other major items not specifically delegated to his staff.

The Fire Boss discharges his responsibility for all phases of the fire control job by:

1. Making all major decisions (after consultation with his staff).
2. Freeing himself of all details and functional duties (by delegating them to his staff).
3. Making periodic inspections of all elements of the operation to insure functioning according to standards, orders and plan.
4. Taking prompt and definite action, through proper channels, to correct deficiencies detected by personal inspection or reported by his staff.
5. Handling personally such specific duties as:
 - a. Conduct all staff and strategy meetings.
 - b. Brief Top Staff (Line Boss, Plans Chief and Service Chief) on their respective jobs - tell them specifically what he expects of them.
 - c. Supervise the work of the Top Staff.
 - d. Conduct on-the-job training of Top-Staff officers on duties in which they demonstrate a lack of knowledge or efficiency.
 - e. Delegate authority to act whenever he leaves the Fire Headquarters for an extended period.
 - f. Insure that, in his absence, the Acting Fire Boss will remain at the Fire Headquarters until relieved.

- g. Initiate action to provide for the safety and welfare of all personnel. Insure that all staff inspections place special emphasis on this item.
- h. Insure that a high level of performance is maintained throughout the operation, including the mop-up stage of the fire.
- i. Visit critical and potential problem areas personally.
- j. Insure that subordinates (particularly Line Boss, Plans and Service Chiefs) secure sufficient rest to insure efficient operation.
- k. By proper planning and delegation secure sufficient rest.
- l. Determine proper time and rate of demobilization of Plans, Service and Line Units.
- m. Approve location and layout of Fire Headquarters.
- n. Perform all duties of the Fire Headquarters not delegated to one of the Unit Staffs.

THE LINE UNIT

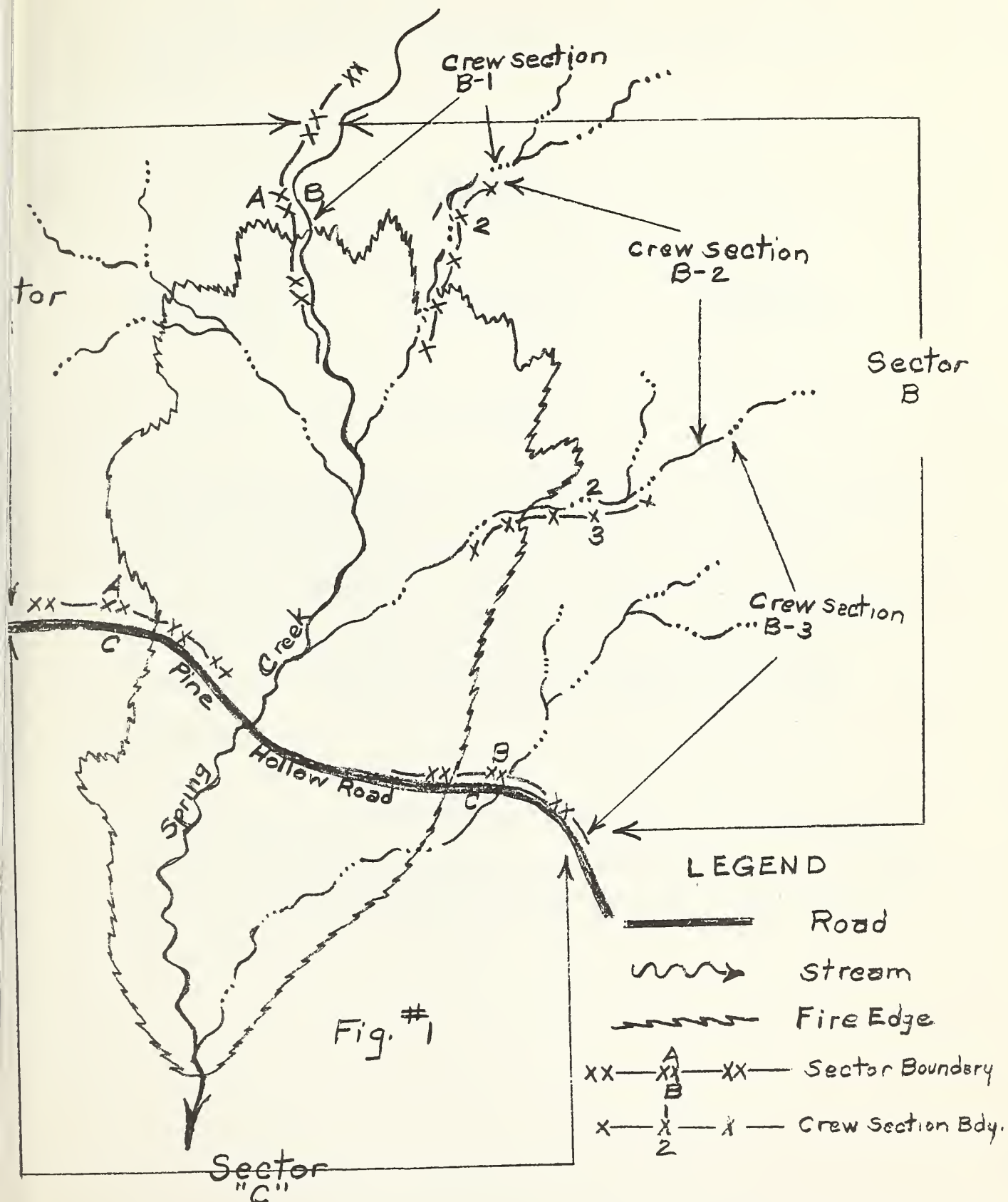
The Line Unit is the assault force of the Fire Organization. All other Units must function to support and facilitate its work. The primary function of the Line Unit is to take direct field action on the fire, in accordance with the broad strategic plan of the Fire Boss, to the end of extinguishing it as quickly and efficiently as possible commensurate with the resources available.

The Line Boss is the Unit Chief. He is directly responsible to the Fire Boss for the operation of the Line Unit in carrying out the overall strategic and broad tactical suppression plan. He has sufficient latitude to make decisions within limits defined by the Fire Boss as a part of Standing Operating Procedure (S.O.P.) and as established within the framework of the overall suppression plan. The Line Boss is the field supervisor whose job is to secure safe, efficient suppression action on the entire fire.

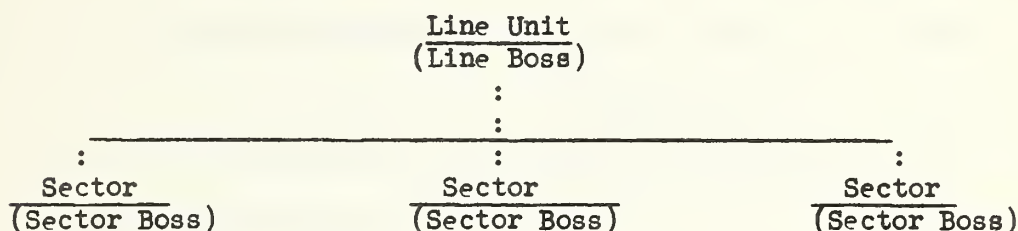
In organizing the job on the ground the Line Boss divides the fire perimeter into segments, called "Sectors", each of which is a portion of the fire perimeter between two designated points, readily identified on the ground. (Fig. #1, page 11). Each Sector is placed in

ORGANIZED FIRE

Showing SECTOR and CREW SECTION Boundaries



the charge of a Sector Boss who is directly responsible to the Line Boss for the operation of that portion of the Line Unit assigned to his Sector. The Line Boss exercises control of the operations of the Line Unit through these Sector Bosses, as shown in the following diagram:



The Line Boss

The position of Line Boss is designed to permit continuous on-the-line direction of suppression action by centering this responsibility in one individual position freed from the responsibility for the general management of the entire suppression project. The Line Boss is relieved of the responsibility for service, supply and long-range planning.

The Line Boss works under the direct supervision of the Fire Boss and is responsible directly to him for the efficient operation of the Line Unit and for participation in Top Staff activities, thus serving in dual roles of:

1. Unit Chief directing the operations of the Line Unit.
2. Staff Officer on the Top Staff of the Fire Boss.

The Line Boss meets these responsibilities by the prompt and timely execution of a series of duties which include:

1. Attend and participate in all Top Staff conferences.
2. Present (on request) suggested plans of control for the approval of the Fire Boss.
3. Insure that all direct suppression action on the fire is in accordance with the overall control plan of the Fire Boss.
4. Present all plans involving a major change in tactics or operation to the Fire Boss for approval prior to execution.
5. Prepare plans for the employment of equipment and personnel in suppression action for the approval of the Fire Boss.
6. Keep Fire Boss informed of anticipated personnel, supervision and equipment requirements well in advance of actual need.
7. Keep Fire Boss currently informed as to the status and progress of the suppression effort and of conditions on the fire line.
8. Keep the Plans Chief currently advised as to:
 - a. Distribution of Line Unit personnel and equipment on the fire.
 - b. Information required by the Line Unit to anticipate changing problems and to maintain the plan of control current.

- c. Proposed assignment of incoming personnel, distribution by job classification, and of proposed arrangements for integration into the organization.
 - d. Map and photograph requirements of the Line Unit.
 - e. The current situation on the line and new developments which may require correlation with other Units of the Fire Headquarters.
9. Advise the Service Chief currently as to:
- a. Equipment requirements of the Line Unit.
 - b. Transportation " " " " "
 - c. Communication " " " " "
 - d. Feeding requirements of the Line Unit and arrangements required to correlate feeding with the suppression effort.
 - e. Proposed disposition of incoming tools and power equipment.
10. Insure, through proper staff participation, that Line Unit action is correlated with that of other Units of the Fire Headquarters.
11. Supervise the work of Sector Bosses by:
- a. Advising them of the details of their job and what he expects of them - the responsibility and authority he is delegating to them and any limitations of action he is establishing as a control measure. Advising them of the policy and standards of operation of the Line Unit.
- (These must be correlated with those of the Fire Boss.)

- b. Assignment to Sectors - Show them Sector Boundaries.
- c. Advising of labor, supervision and equipment assigned to each Sector.
- d. Providing each with a map or sketch on which essential locations are plainly marked.
- e. Outlining communication facilities available - methods and frequency of keeping him informed.
- f. Briefing them fully on:
 - (1) The general situation.
 - (2) The overall plan of control for the entire fire.
 - (3) Special conditions on each Sector and the plan of operation therein.
 - (4) Alternate plans for each Sector and principal escape routes.
- g. Designating general suppression techniques to be followed and means of correlating effort between Sectors.
- h. Outlining procedure to be followed in handling change of shift, on-the-line feeding, transportation, first-aid, etc.
- i. Outlining safety measures and special precautions to be observed in the conduct of the work with special emphasis on escape routes.
- j. Visiting each Sector at least once during each shift.
- k. Inspecting the work in progress on each Sector with the Sector Boss and offering constructive ~~commen~~ts and advice.

1. Correlating the work between Sectors to insure smooth and well-balanced accomplishment in keeping with the overall control plan of the Fire Boss.
- m. Adjusting the labor, tool and power equipment resources of each Sector to maintain a level commensurate with the job at hand.
- n. Taking prompt and decisive action to correct deficiencies in accomplishment, standard of work, planning or supervision as determined by personal inspection or reliable report.
12. Assume full responsibility in each Sector until such time as a Sector Boss is assigned and during such periods as he may authorize the Sector Boss to be relieved of the active responsibility for the Sector.
13. Determining the need for an immediate redistribution of resources to meet unanticipated conditions. If time and communications permit he informs the Fire Boss of the new situation and action he is taking to meet it. If need for redistribution is urgent and communications and other factors prevent prompt contact with the Fire Boss, the Line Boss takes prompt action to effect the adjustment and notifies the Fire Boss of this action at the earliest possible moment.
14. Determining the use and disposition of planned reserves, calling them into action as needed without further clearance.

When such action is taken he informs the Fire Boss promptly and requests that new reserves be provided as replacement for those used.

15. Specifically delegates his authority to act when leaving Fire Headquarters under conditions which will prevent his being in constant communication with the Fire Boss and Top Staff.

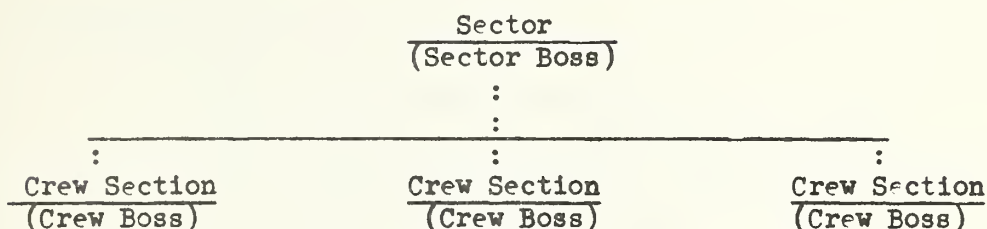
THE SECTOR

In organizing a fire suppression project on the ground the fire perimeter is divided into segments as a basis for fixing area responsibility for supervision of the suppression action. These segments are called SECTORS. Each Sector is placed in the charge of a single individual called the SECTOR BOSS who has full responsibility for all suppression operations within his Sector.

The Sector is the primary unit of area organization of a fire suppression project just as the Sector personnel organization is the primary operating subdivision of the Line Unit. (See Chart page 13.)

In applying the principles of good job management the Sector Boss divides the portion of the fire perimeter within his Sector into

segments called CREW SECTIONS and places an individual called a CREW BOSS in charge of each. (See Fig. #1, page 11.) Under normal operating conditions the Sector Boss controls the operations within his Sector through these Crew Bosses, as shown in the Sector line-of-authority chart below:



The Sector Boss

The Sector Boss is directly responsible to the Line Boss for all direct suppression action on the portion of the fire within his Sector and has full authority within the limits established by the Line Boss. He sets in motion and supervises the operations required to execute the over-all action plan of the Fire Boss for his Sector. He insures the rate of progress and quality of performance necessary to meet the time requirements of the control plan. He determines specifically the time for starting and completing the individual operations on his Sector. He guides, coaches and assists Crew Bosses and Sector Specialists on his Sector as necessary to secure the quality and quantity of work required. He remains on his Sector until specifically relieved.

The Sector Boss discharges these responsibilities by the execution of a number of duties which include:

1. Make a definite assignment of specific section of line or area to Crew Bosses. (Crew Sections.)
2. Assign specific jobs or functions to Sector Specialists (p. 33)
3. Organize the labor, tool and equipment resources assigned to the Sector into an efficiently operating organization.
4. Brief all Crew Bosses and Sector Specialists on:
 - a. The general situation concerning the fire.
 - b. The special situation and conditions pertaining to that Sector.
 - c. The location of the work and plan of operation.
 - d. The techniques to be employed.
 - e. The standard of performance required (both quality and time limits).
 - f. The organization within the Sector.
 - g. The special problems anticipated and how they are to be handled.
 - h. The arrangements for relief, feeding, transportation, tool repair and replacement, first-aid and other service facilities.
 - i. Alternate plans, escape routes and safety precautions to be observed and enforced.
 - j. Communication facilities available.

- k. When, Where and How they are to report to him.
- l. The specific relation between the Crew Bosses with their crews and the Sector Specialists with their equipment operators and how the two groups will operate in the same general area.
- m. Off-shift responsibilities such as:
 - (1) Time reports.
 - (2) Tools, equipment and supply responsibility.
 - (3) Messing schedules and procedure.
 - (4) Sleeping arrangements.
 - (5) Commissary availability and procedure.
 - (6) First-aid and medical attention.
- 5. Guide, coach and assist Crew Bosses and Sector Specialists in organization and supervision to insure that the quality and quantity of work required will be attained.
- 6. Keep Line Boss informed currently as to conditions and progress within the Sector.
- 7. Correlate plans and methods within the Sector with those of Sector Bosses of adjacent Sectors.
- 8. Anticipate problems within the Sector requiring a change of plans or the assistance of the Line Boss well in advance and so advise the Line Boss.
- 9. Anticipate personnel, tool and equipment requirements well in advance of actual need and advise Line Boss.

10. Advise Line Boss promptly of any shortage of personnel, tools or equipment or if and when these resources can be released by his Sector.
11. Secure the prior approval of the Line Boss before making any change in the resource, tactical or general action plan of the Sector except:
 - a. When action of the fire requires prompt and unanticipated action, such as is necessary to control a break-over or spot fire.
 - b. When the Line Boss or his "Acting" cannot be reached promptly.
 - c. Where the action does not jeopardize the safety of personnel or invalidate the action on adjacent Sectors.

In all cases where such action is taken the Line Boss or his "Acting" at Fire Headquarters must be notified promptly.

12. Keep thoroughly familiar with the fire situation in the Sector by personal inspection, reports of Crew Bosses and Sector Specialists and by the use of Line Locators.* (page 47).
13. Insure that the work is progressing according to plan, and that time and quality standards are maintained by frequent personal inspections of the Crew Sections with the Crew Boss.
14. Take prompt and decisive action to correct deficiencies in accomplishment, standards, organization, planning or

* A Line Locator is an assistant to the Sector Boss and is in no way connected with the Intelligence Scouts of the Plans Unit.

supervision as determined by personal inspection of the work of the Crew Bosses within the Sector.

15. Present to the Line Boss proposed changes in the plan of action and operating procedure for the Sector which he believes will increase the efficiency of the suppression effort.
16. Remain on his Sector until relieved by replacement or specific instructions of the Line Boss.
17. When relieved:
 - a. Insure that all information pertaining to the conditions, progress and plans for future action on that Sector is turned over to the Sector Boss relieving him. In the event he is being relieved by order prior to the arrival of the new Sector Boss such information should be given to the Line Boss.
 - b. Account for all resources (tools, equipment, etc.) assigned to his Sector, as to location and general condition, prior to actual departure from the Sector.
 - c. Prepare for the Line Boss a brief concise report of operations on the Sector during your shift. Such a report should include:
 - (1) Progress made during shift (with sketch).
 - (2) Special problems encountered or anticipated.
 - (3) Critical areas within the Sector.
 - (4) Difficulties encountered (personnel, transportation, feeding, etc.).

(5) Anticipated requirements on the Sector.

(6) Recommendations.

In general the Sector Boss is responsible for the planning and execution of the detailed suppression effort on his assigned Sector within the limits of the overall suppression plan for the fire and the broad general orders and instructions of the Line Boss.

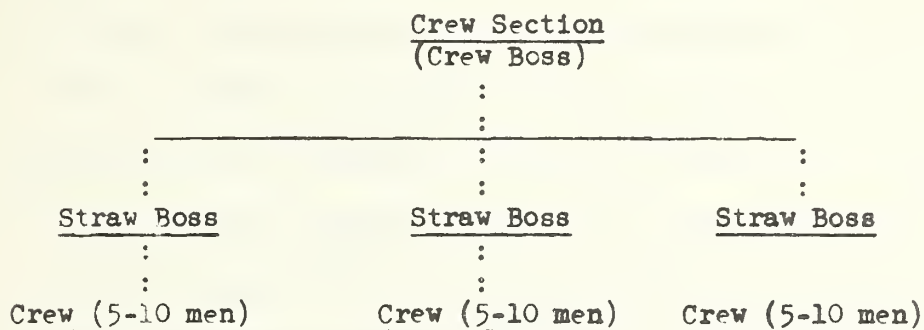
THE CREW SECTION

As described above, the Crew Section is a subdivision of the Sector, both as to area and organization. (See Fig. 1 and org. diagram on pages 11 and 19.

The Crew Section is the lowest echelon of the Line Unit which has responsibility for, and sufficient latitude to permit, tactical decision and planning. It is the operating level which is actually in contact with the fire and at which the resources and techniques are applied in the suppression effort.

The organization of a Crew Section includes two or more Straw Boss crews of 5 to 10 men each which are assigned to jobs within the Crew Section in the manner which the Crew Boss believes will best

accomplish the portion of Sector job assigned to his Crew Section.
 The Crew Boss controls the operation of his crews through the Straw Bosses as indicated by the following chart showing the organization of the Crew Section:



The Crew Boss

The Crew Boss works under the direct supervision of the Sector Boss to whom he is responsible for the efficient planning and execution of the suppression assignments to his Crew Section.

In addition to the supervisory and management responsibilities assigned by the Sector Boss, a Crew Boss has definite personnel responsibility for the Straw Bosses and men assigned to his Crew Section. From the time a man is assigned to one of his crews until that man leaves the crew through transfer, discharge or termination of employment the Crew Boss is responsible for his training, safety, welfare, conduct and performance, both on and off shift.

The Crew Boss must take the necessary action to insure that the Crew is awakened, fed, blankets turned in, equipped with the proper tools and assembled at the assigned loading point at the time set up in the shift schedule. On arrival at the fire line he must insure that crews are assigned jobs and properly lined out on them by the Straw Bosses. If training in use of tools or techniques is needed he acts promptly to insure such training by a competent Straw Boss or handles it himself. During the shift he supervises the work, plans the job ahead and inspects to insure that policies, standards and instructions are complied with. Throughout the period he must be constantly alert to insure the safety and welfare of his men. At the close of the shift he moves his Crews as a group to the loading point after being properly relieved by the incoming Crew Boss and his Crew. On arrival at the Fire Camp he keeps his Crews together, turns in their time record for the shift to the timekeeper, supervises turn-in of tools and sees that his Crew is cleaned up and fed. He reports to his Sector Boss on the shift accomplishment and receives instructions for the next shift. Before going to bed he checks to insure that the proper lunch order for his Crew for the next day has been placed with the Mess Steward and the sleeping area occupied by his Crew reported to the Camp Boss. He also insures that any minor injuries received by his Crew during the day are given adequate treatment and their commissary needs are taken care of. He then assembles his Crew, draws blankets for them and the group moves to the assigned sleeping

area where they will rest until called to prepare for their next shift.

In contrast to the higher echelons of the Line Unit the Crew Boss is a planner and supervisor of detail. He is the immediate supervisor of working Crews and through their operations he implements the plans of higher authority to attain complete suppression of that portion of the fire in his Crew Section.

The Crew Boss is directly responsible to the Sector Boss for the efficient organization and operation of the resources assigned to him within his assigned Crew Section. He redeems this responsibility by the prompt and timely performance of a number of duties which include:

1. Brief Straw Bosses and their Crews on:
 - a. The general situation pertaining to the fire.
 - b. The special situation on that Crew Section.
 - c. The organization within the Crew Section (chain of-authority).
 - d. Assignment of Crew jobs and plan of operation.
 - e. Tactics and techniques to be employed.
 - f. Standards of performance to be attained (quality and time limits).
 - g. Special problems anticipated and how they are to be handled.
 - h. Alternate plans, escape routes and safety precautions to be observed and enforced.

1. Administrative arrangements and procedure:
 - (1) Time reporting.
 - (2) Messing schedules and feeding arrangements .
(at camp and on-the-line).
 - (3) Tool and equipment procedure and responsibility.
 - (4) Sleeping arrangements.
 - (5) Commissary availability and procedure.
 - (6) Camp and transportation routine and procedure.
 - (7) First-aid and medical attention.
 - (8) Safety practices.
- j. Working relation between Crews and Sector Specialist Crews
which may assist within the Crew Section.
2. Inspect individual Crew members for proper clothing and shoes before taking them on the line. Return unsatisfactory ones and request replacement from the Sector Boss.
3. Organize Crews, tools and equipment into a smoothly operating routine which will adequately and efficiently accomplish the Crew Section job.
4. Coach, guide and assist Straw Bosses in organizing their Crews and operating them to the best advantage.
5. Inspect Crew accomplishment at frequent intervals for quality, quantity and conformance to standards and plans.
6. Plan in detail the jobs to be accomplished during the shift and correlate this work with plans and standards of adjacent

Crew Sections.

7. Anticipate personnel, tool and equipment requirements well in advance of actual need and advise Sector Boss.
8. Anticipate problems requiring a change of plan or the assistance of the Sector Boss and make these problems known to him well in advance.
9. Keep Sector Boss informed currently of conditions and progress within the Sector.
10. Advise Sector Boss promptly of any shortage of personnel, tools, equipment or technical assistance or if and when such resources can be released by the Crew Section.
11. Secure prior approval of the Sector Boss before making any radical departure from the approved action plan for the Crew Section except;
 - a. When action of the fire requires prompt and unanticipated action such as is necessary to control a break-over or spot fire.
 - b. When the Sector Boss cannot be reached promptly.
 - c. When the action taken does not jeopardize the safety of personnel or invalidate the action on adjacent Crew Sections.
12. Take prompt and decisive action to correct deficiencies in accomplishment, standards, organization or supervision as determined by personal inspection of the work of the Straw Bosses within the Crew Section.

13. Present to the Sector Boss proposed changes in plan of action and operating procedure for the Crew Section which he believes will increase the efficiency of the suppression effort.
14. Remain on his Crew Section until relieved by replacement or specific instructions from the Sector Boss.
15. When relieved:
 - a. Insure that all information pertaining to the Crew Section as well as plans for the next shift are passed on to the Crew Boss of the new shift. This includes danger spots, special problems and other items which may influence the work of the next shift.
 - b. Account for all tools, equipment and supplies assigned to his Crew Section as to location and general conditions before leaving the Crew Section.
 - c. Give the Sector Boss a verbal report (written if requested) of activity on the Crew Section during your shift, including such information as:
 - (1) Accomplishments during shift.
 - (2) Special problems encountered.
 - (3) Hot spots and critical areas within the Crew Section.
 - (4) Anticipated requirements.
 - (5) Recommendations as to future action desirable.

In general the Crew Boss is responsible for the planning and execution of the many detailed jobs which must be completed to insure a thorough

suppression job. He must insure at all times that the action of his Crews is within the framework of the Sector action plan and meets the standards laid down by the Sector Boss. In addition he has a job of personnel supervision which must be well done to insure that Crews are maintained at maximum efficiency.

The Straw Boss

The Straw Boss is a working leader of laborers, usually 5 to 10 men. He works directly under the Crew Boss (see diagram p. 25) to whom he is responsible for the safe and efficient employment of his Crew on specifically assigned jobs.

The Straw Boss fulfills these responsibilities by the timely performance of a number of duties among which are:

1. Insures that he understands what the Crew Boss wants done and the standards which the job is to be completed. .
2. Sees that his men are equipped with the proper tools for the job to be done.
3. Checks that each man knows the proper use and care of the tool with which he is equipped. If not, give the man on-the-job training.
4. Makes sure that his Crew has first-aid kits, files and axe stones, headlights (if needed) and similar necessary equipment before leaving camp.

5. Checks that each man is equipped with proper clothing and shoes prior to going on the line.
6. Keeps Crew together and insures their safety during transportation to and from the line.
7. On the line sees that the Crew is well organized for the job they are doing and working smoothly with no wasted effort on unnecessary work.
8. Supervises Crew to insure that each does a reasonable day's work.
9. Makes special checks to insure safety practices are followed on the line at all times.
10. Observes and enforces smoking rules.
11. Reports lazy and incompetent men and agitators to the Crew Boss.
12. Insures that men have lunches and drinking water.
13. Maintains a current list of names of his Crew and keeps their time if so requested by the Crew Boss.
14. Assists the Crew Boss in checking Crew and tools out and in, drawing blankets and other off-the-line duties.
15. At all times apply the principles of good leadership to raise and maintain the morale of the Crew as a unit and of the individual Crew members.

The Sector Specialist

Within the Fire Organization on most large fires and often on small fires there is brought into use the services of special equipment which is used as a Supporting Unit to the fire control work of the Section. When the supervision of this equipment monopolizes too much of the Sector Boss's time from over-all supervision of his Sector it is necessary to turn over the direction of this equipment or operation to men specially trained in its use. These men are called Sector Specialists. They are not necessarily confined to one Sector but may support the Line Unit anywhere under initial orders of the Line Boss such as a dozer operation or a long relayed hose line.

While in the Sector, however, they work under the direction of the Sector Boss. (See Fig. #2, page 39).

The Sector Specialists are trained men who can supervise Crews in effective fire control use of the following: pumps and tanker, dozer operation, back firing, saw operation, fire plow operation, and special line work such as mopping up fire on steep ledges. He must know enough of the operation of each piece of equipment to know its capabilities and limitations. For instance a heavy dozer can build line in surprisingly rough country but its speed is limited and it is impossible to move it quickly out of danger from a blow-up on the line. Various models of portable pumps differ in their ability to

push volumes of water up a hill and the use of a low volume pump in a line may cut the efficiency of the whole operation 50%.

The number of men in the Crew of the Sector Specialist will depend on the amount of equipment to be operated and the size of the job. One dozer or tractor-plow unit may make up the whole Crew while on a long pump line the Crew may run to 18-25 men. The Crew may need to be wholly or in part of men trained in the specialized job such as the dozer or the Pacific Type Y pump operator or it may consist of a few specialists such as the back fire torch man and a Crew from the Sector assigned to the job. Line firing or burning out is done on the Sector as the regular job under the Sector or Crew Boss.

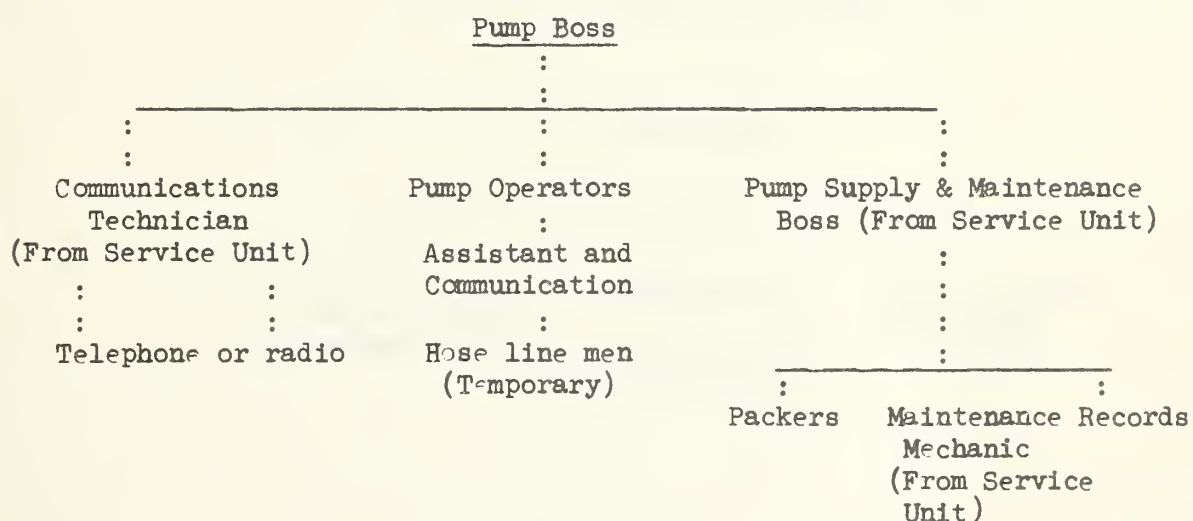
Irrespective of the type of operation the Sector Specialist shall:

1. Secure maximum effectiveness from his assigned resources.
2. Provide technical direction for the conduct of the operation.
3. Supervise and correlate the work of individual pieces of equipment and/or Crews assigned for his operation.
4. Relieve the Sector Boss of all but general supervision and spot checking on the operation.
5. Provide for the safety and welfare of the equipment and/or personnel assigned to him from time of assignment to release.

The Sector Specialist may perform as a member of his Crew if the Crew is of one unit. That is, he could be line locator for the dozer

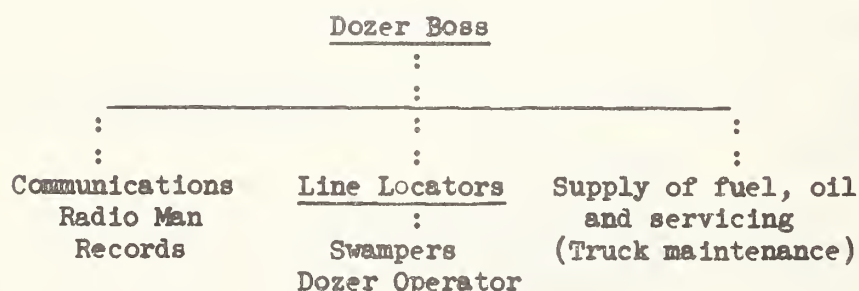
operator or safety man for a snag fallers unit but when more than one unit is involved he must be free to supervise.

The organization within a Sector Specialist's Crew can best be shown by an example. The Fire Boss has decided to use water on a stubborn mountain fire. From the difference in elevation and the length of the line the Pump Boss decides he needs 5 Type Y pump units, 8 thousand feet of hose, 4 canvas relay tanks, 5 pump operators, 25 men temporarily as packers and to lay out the above. To provide communication he will need 5 telephones and 1-3/4 miles of wire and 5 operators to man the phones and to spell and assist the pump operators. Before his initial supply of gas runs out he will need a man at the supply depot to properly mix the fuel, gas and lubricant, and packers to keep the pumps supplied. If trouble develops he will need an expert pump mechanic and spare pumps to be moved in in case of complete failure. Extra hose will need to be cached along the line in case of hose failure. His organization will now look like the following:



He would select and organize the layout of each pump site, give specific directions and when all are installed he would coordinate the whole so as to deliver the maximum of water for as long a period as it is needed. His direction stops just beyond the final pump or where feeder line takes off to the fire line. His job is to deliver the water. It is up to the Sector Boss to see that the water which is delivered is used to the best advantage and is not wasted. If the line is lengthened he adds pump and hose and when the job is done he supervises the dismantling and return of all equipment to the supply depot.

Another example would be a Dozer Boss who has been ordered to build a line on the flank of a running fire. He has two dozers with experienced operators who just came off a job making roads for logging crews in the woods. His line locator works along the fire edge spotting the line where it can be established before the fire reaches that point. He has a swamper to find the spots ahead of the dozer and signal the operator. He arranges for gas and gets it delivered to his men. His organization might be like this:



When he finished his work in one sector he would automatically come under the direction of the next Sector Boss, the Sector Boss notifying the Line Boss of the shift. His job is to direct the operation, maintain contact with the Sector Boss and look out for the safety and welfare of his men and equipment.

The Sector Specialist then directs a specific Crew with special equipment to do a specified job on the Sector. He works under the Sector Boss, but may be shifted at the will of the Line Boss.

ORGANIZATION CHART - THE LINE UNIT

Line Unit
(Line Boss)

Sector
(Sector Boss)

Sector
(Sector Boss)

Sector
(Sector Boss)

Crew Section
(Crew Boss)

Sector Specialist
(Pump Boss)

Crew Section
(Crew Boss)

Sector Specialist
(Dozer Boss)

Crew Section
(Crew Boss)

Straw Boss

Straw Boss

Straw Boss

5-10 Laborers

Pump Crew
(Portable)

Pump Crew
(Fire Truck)

Pump Crew
(Portable)

Dozer Crew #1

Dozer Crew #2

Fig. #2

S U M M A R Y

The Line Unit

We have discussed the Line Unit in detail, its functional responsibility and the responsibilities and duties of its personnel at the various supervisory levels. Let us now look at the Line Unit as a whole and summarize briefly the principles on which its operation is based.

First a review of the complete organization chart of the Line Unit on page 13 provides the composite picture of the organizational structure of the Line Unit. As shown by the organization chart on page 16, the Line Unit is one of the three principal Units of the Fire Organization. The chief supervisory officer of the Fire Organization is the Fire Boss who is fully responsible to higher authority for the suppression of the fire. He accomplishes this by applying suppression resources of personnel and equipment to the fire in well planned and coordinated operations which are controlled by means of the Fire Organization.

The Fire Boss is responsible for all major decisions and for directing all operations of his Fire Organization in completely extinguishing the fire and returning the suppression resources to their original source in the best condition possible.

A Fire Boss discharges his responsibility by:

1. Delegating responsibilities, and the authority with which to discharge them.
2. Announcing his decisions in the form of clear, concise and complete orders (the Five-Paragraph Fire Order).
3. Supervision to insure that orders are executed:
 - a. Promptly.
 - b. In compliance with stated policy.
 - c. In conformance with established standards.
 - d. In conformance with the overall Plan of Control.

As illustrated by the chart on page 6 , the Fire Organization is composed of three basic Units; the Line Unit, the Plans Unit, and the Service Unit. Of these let us consider the details of organization of the Line Unit.

The Line Unit is the primary Unit of the Fire Organization. It must accomplish the actual suppression job. The Line Unit is the Unit which applies the suppression resources directly to the fire on the ground. The remaining units of the Fire Organization function only to facilitate the work of the Line Unit.

The Unit Chief of the Line Unit is the Line Boss. The Line Boss, as Chief of the Line Unit, is responsible directly to the Fire Boss for:

1. On the ground employment of his Unit to extinguish the fire promptly and efficiently.
2. Staff participation in the planning effort.

The Line Boss discharges these responsibilities by:

1. Delegation of responsibility and authority to subordinates.
2. Issuing brief, clear, concise and complete orders (Five-Paragraph Fire Order).
3. Supervision to insure that orders are executed promptly in compliance with stated policy, standards and the overall plan of suppression.

The Line Boss has two jobs:

1. As a staff officer on the Fire Boss Top Staff (staff function).
2. As supervisor of the Line Unit (line function).

The Line Boss must be:

1. A good planner (staff function).
2. A good organizer and supervisor (line function).
3. A good leader (leadership function).

The Line Boss, in handling his job through application of the principles of good job management, divides the fire perimeter into segments called Sectors (see Fig. #1, page 11). He delegates responsibility

for the suppression action on each Sector to a subordinate called a Sector Boss to whom he gives appropriate authority.

The Sector Boss is responsible directly to the Line Boss for efficient suppression action within his Sector. He discharges this responsibility by:

1. Delegation of responsibility and authority to subordinates.
2. Issuing brief, clear, concise and complete orders (Five-Paragraph Fire Order).
3. Supervision to insure that orders are executed promptly in compliance to stated policy, standards and the overall plan of suppression.

In organizing the Sector suppression job in accordance with the principles of good job management the Sector Boss divides his Sector into segments called Crew Sections, and delegates responsibility for each Crew Section to a Crew Boss.

The Crew Boss is directly responsible to the Sector Boss for all suppression and action within his Crew Section. In addition he is responsible for the organization, welfare, safety, and proper training and functioning of the individual members of his Crews. In accordance with the principles of good job management the Crew Boss normally divides his personnel into groups of from five to ten men

each and places in charge of each Crew a working leader called a Straw Boss who is responsible directly to the Crew Boss for keeping his Crew together, properly organizing them, and applying them to the work at hand in an efficient manner.

In addition to the above supervisory personnel within the Line Unit the services of especially trained and experienced supervisors are frequently necessary to handle particular critical jobs or jobs involving the operation and maintenance of special equipment and special Crews. Such an individual is called a Sector Specialist.

The Sector Specialist is assigned, together with his Crews and equipment, to a specific Sector to do a specific job, by the Line Boss. While operating on that Sector the Sector Specialist will take orders directly from the Sector Boss. At such time as his special job is completed he is normally released by the Sector Boss to the Line Boss for another assignment.

In carrying out some operations it may be desirable for the Sector Boss to assign the Sector Specialist to work directly under one of his Crew Bosses. In such a case the Crew Boss decides Where and When the work is to be completed, the Sector Specialist decides How.

In considering the Line Unit in the light of its position and

functional responsibility within the Fire Organization as a whole it should be remembered that:

1. The Line Unit is the Assault Echelon of the Fire Suppression Team.
2. The primary mission of the Plans Unit and Service Unit of the Fire Headquarters is to support the Line Unit and facilitate its functioning.
3. The success or failure of the Line Unit in the accomplishment of its mission determines the success or failure of the entire suppression effort.

S P E C I A L J O B S

The Line Unit

The jobs discussed in the foregoing pages are those which are normally manned in the Line Unit on a fire suppression project. It has been found, however, that in the case of extremely large fires and under special conditions of terrain, fuel types, weather or isolation of a portion of the fire area it is sometimes necessary to set up and man additional jobs to insure proper control of the suppression force. A few of these jobs will be discussed briefly.

The Line Locator

Another position that is frequently set up and manned under certain conditions is that of Line Locator. This position is in no way related to the Intelligence Scouts who operate under the Intelligence Officer of the Plans Unit. In the practical field application the Line Locator is actually an assistant of the Sector Boss and is employed wherever possible to facilitate his work. For example, the Line Locator is frequently utilized by the Sector Boss to furnish him information on the nature of terrain, fuel type, trails, water holes or pump chances, or any other information on remote parts of the Sector, where the actual obtaining of this information by the Sector Boss personally would involve considerable time and travel on his part and would detract from his availability for performing his supervisory function on the Sector. In some cases the Line Locator may be utilized as a messenger, as a radio operator, or as a guide for reinforcing crews or Sector Specialist who may come to the Sector for the first time. In general the determination as to whether or not a Sector Boss sets up one or more Line Locator positions will be based on the need for such assistance as a Sector Scout could render to the Sector Boss. In some cases a similar position is set up by a Division Boss to facilitate his contact with the Sector Bosses within his Division. In such a case this position would be known as that of Division Scout. In either case the position is

largely that of "leg man" and the type of work assigned will be largely dependent upon the background and capabilities of the individual selected to fill the position. Seldom will such an individual operate within the field normally covered by the well trained and capable Intelligence Scout. In cases where the services of such a Scout are needed, either at the Division or the Sector level, it has been found most satisfactory to arrange for one of the regular Intelligence Scouts to be attached directly to the Division or Sector Headquarters and to work during the period of such attachment directly under the orders of the Division or Sector Boss. Such an arrangement is a field expedient which should be used without hesitation where conditions justify but should not be considered a normal or standard mission for the Intelligence Scout.

Other Jobs

At all levels within the Line Unit it may be advantageous and necessary under certain conditions to establish additional supporting jobs to the basic supervisory positions. For example, in a long continued and active fire it may be necessary to set up an assistant Line Boss as a relief and understudy to the regular Chief of the Line Unit. In like manner Assistant Division Bosses may also be used. At these levels it is seldom desirable to have two or three individuals occupying the same position and title on a shift basis if continuity of plan

is to be observed. At the level of Sector Boss and below, however, it is most desirable that these positions be operated by shifts and so, on a given Sector during a 24-hour period, there would be three Sector Bosses, one for each of the three shifts. The same is true of supervisory positions below this level. Other positions which may be set up as conditions warrant are those of Radio Operator, Telephone Operator, Messenger, and in some cases that of Field Clerk. Before setting up these positions however, the need for such services should be carefully considered and balanced against the need for the services of such personnel on the fire line or elsewhere within the organization. Other positions which are frequently set up are that of First-Aid Men and Water Carrier to insure fresh drinking water for personnel on the fire line.

THE LINE UNIT ON A THREE-DIVISION FIRE

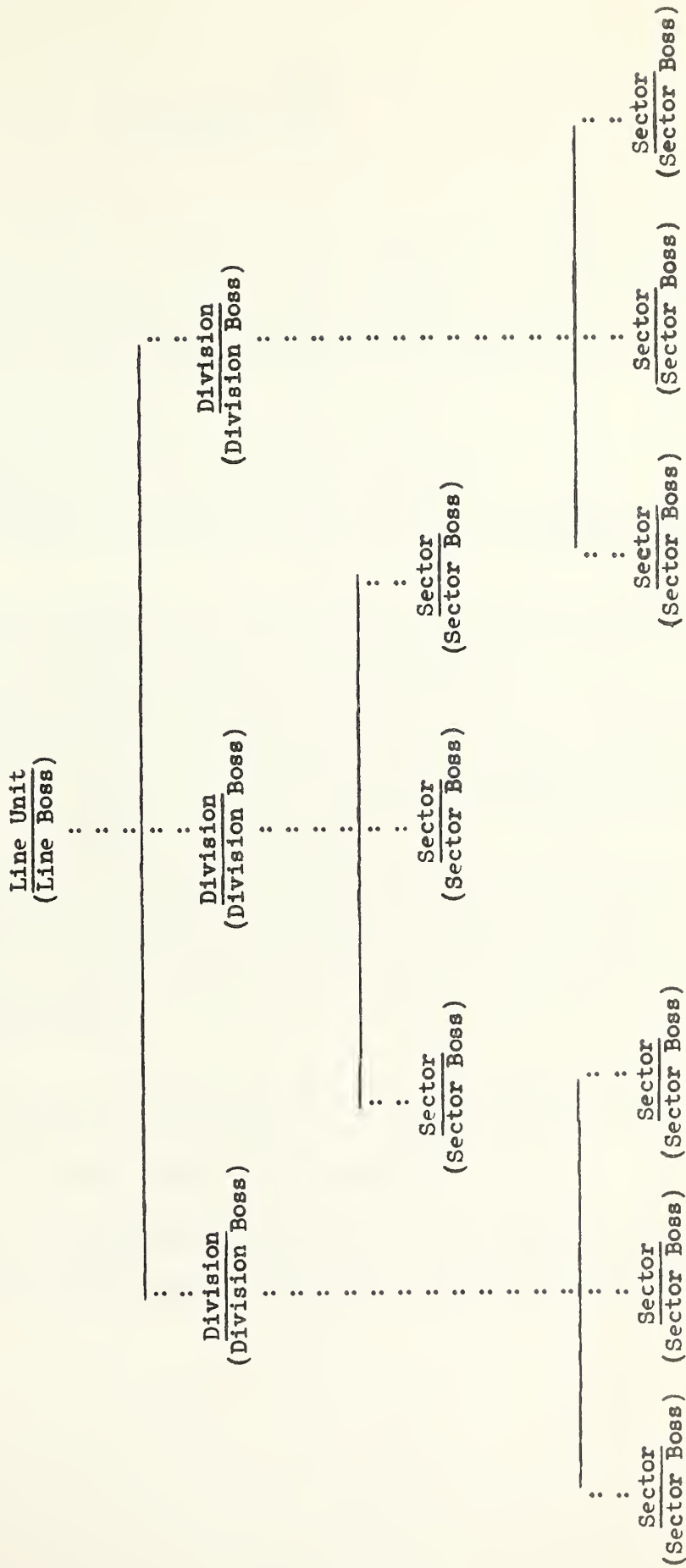


FIG. #3

THE PLANS UNIT

The Plans Unit is one of the three basic Units of the Fire Organization.

The Plans Unit accomplishes its general mission of support to the other Units of the Fire Headquarters by the performance of two primary functions:

1. The collection and recording of information.
2. By acting as an operation center for the Fire Organization.

Under the primary function of collecting and recording information the Plans Unit has two principal jobs to perform:

1. To obtain, evaluate and distribute all information which will affect the action of the fire and the planning and execution of the suppression action on it.
2. To maintain an adequate, accurate, current record of all activities pertaining to the fire and to the suppression action thereon.

Under the second functional activity of the Plans Unit there are also two principal jobs which must be accomplished:

1. To act as an Operation Center for the Fire Organization.
2. To operate the Message Center for the Fire Organization.

The Chief of the Plans Unit, designated as the Plans Chief, is responsible directly to the Fire Boss for the efficient operation of the Plans Unit in performing its primary functions as outlined above. As the Chief of the Plans Unit he is a member of the Top Staff of the Fire Boss and his capacity of Fire Operations Officer he also acts as the "Adjutant" or Chief-of-Staff for the Fire Boss. He assists in the planning work of the Top Staff by providing much of the basic planning information and material such as maps, etc., and by coordinating the efforts of the other Units of the Fire Headquarters. Once the details of the current plan have been decided upon by the Staff and approved by the Fire Boss the Plans Chief, through his Unit Staff, prepares and distributes the current plan in the form of a "FIVE-PARAGRAPH FIRE ORDER". (See Appendix, page A-35).

In applying the principles of good job management the Plans Chief segregates the Plans jobs into Sections and delegates both responsibility and the authority with which to meet it for the operation of each Section to his subordinates. He divides the Plans jobs into two Sections, the Intelligence Section and the Records Section, and places subordinates, designated as the Intelligence Officer and the Records Officer respectively, in charge of the Sections as shown by the line of authority below:

Plans Unit
(Plans Chief)

:
:
:

:
:
:

:
:
Records Section
(Records Officer)

:
:
:

:
:
Intelligence Section
(Intelligence Officer)

The Plans Chief directs the operation of the Plans Unit through these Section Chiefs.

The Plans Chief

The Plans Chief is the key member on the Top Staff of the Fire Boss. He must know staff operation and techniques as well as have a thorough knowledge of the fire suppression job. In his role as Chief of the Plans Unit he must be able to organize and supervise many jobs of detailed work. He must have the ability to evaluate information in terms of its influence on the fire suppression operation and to present this evaluation to the Fire Boss and his Staff in a brief, clear and logical manner. In his role of "Adjutant" or Fire Operations Officer he actually operates or manages the entire Fire Headquarters as a business manager for the Fire Boss.

He is responsible directly to the Fire Boss for:

1. The efficient functioning of the Plans Unit.
2. The smooth coordinated operation of the Top Staff as a planning team.
3. The efficient coordination of the work of the Units of the Fire Headquarters.

He discharges these responsibilities through the prompt and timely execution of a number of duties among which are:

1. As Chief of the Plans Unit:
 - a. Organize, train and supervise the personnel of the Plans Unit to insure its efficient operation.
 - b. Insure that current information and record data are maintained in such form as to facilitate ready summary at any time.
 - c. Review Intelligence and Record data at frequent intervals and evaluate it in terms of its possible influence on the behavior of the fire and the plans and progress of the suppression effort.
 - d. Prepare an estimate of the entire fire situation, based on evaluation of information, daily and more frequently as changes in the situation require.
 - e. Keep the Fire Boss and Top Staff fully informed at all times as to the current situation. When new information indicates a major change in conditions the Fire Boss must be informed at once.

- f. On request present a summary of the fire situation:
 - (1) As a briefing to new supervisory personnel going on the line for the first time.
 - (2) To visiting fire control personnel from other organizations or from higher echelons of his own organization.
 - (3) To the Staff of the Fire Organization for the purpose of bringing everyone up to date on the current situation.
- g. Provide maps, sketches and overlays of the fire area as requested by the Fire Boss and other Unit Chiefs.
- h. Participate in Board-of-Review proceedings following the close of the fire.
- 2. As a member of the Top Staff:
 - a. Attend and participate fully in all Top Staff conferences.
 - b. Be prepared to present at any time in clear, concise and logical form the latest evaluated information relative to fire situation and progress of the control action.
 - c. Be prepared on request to present to the Fire Boss and the Staff suggested plans of control, both strategic and tactical.
 - d. Participate in detailed planning of the suppression operation with the Fire Boss and other members of the Top Staff.
- 3. As Fire Operations Officer ("Adjutant" for Fire Boss):
 - a. Arrange Top Staff conferences as directed by Fire Boss.
 - b. Prepare and distribute fire orders as required to implement decisions and plans of the Fire Boss.

- c. Coordinate planning activities of the Units.
- d. Handle general business routine and reports for the Fire Boss.
- e. Serve as "Acting Fire Boss" as requested.
- f. Act as relief for Line Boss and Service Chief.
- g. Coordinate scheduling and general routine of the Fire Headquarters.
- h. Keep Fire Boss informed on latest information and developments throughout the Fire Organization.
- i. Make such field inspections of all elements of the Fire Organization as the Fire Boss may direct and report the findings in writing, or verbally, in accordance with the Standing Operating Procedure (S.O.P.) of the Fire Headquarters.
- j. Bring to the attention of the Fire Boss such complaints as may be received from personnel of the Fire Organization, at all levels, and take such action on them as he may direct.
- k. Relieve the Fire Boss of all possible administrative detail consistent with his policies and S.O.P. and at the same time keep him fully informed regarding all elements of the Fire Organization and their progress in the suppression effort.

The Plans Chief, in addition to supervising the Plans Unit to insure efficient operation, must act as the Chief Assistant of the Fire Boss

and, in the role of Operations Officer, relieve the Fire Boss of all possible administrative detail in the operation of the Fire Headquarters thus leaving him free for the planning, supervision and direction of the over-all suppression project.

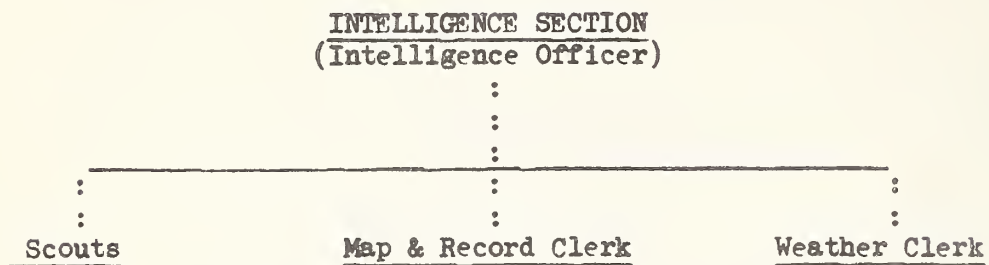
THE INTELLIGENCE SECTION

The Intelligence Section of the Plans Unit has the functional responsibility of securing, recording and evaluating all possible information regarding the location and size of the fire and all factors which may influence its behavior.

The Intelligence Officer is the Chief of the Intelligence Section. He is directly responsible to the Plans Chief for the organization, training and supervision of the personnel of his Section to the end that the Section operates smoothly and efficiently in adequately discharging its functional responsibility of providing timely intelligence support to the suppression effort.

In organizing his Section the Intelligence Officer applies the principles of good job management by dividing the work of the Section into three job classes of Scouting, Map and Record Clerk, and Weather Clerk. The relation of these jobs to each other and to the Intelligence

Officer is illustrated by the following diagram of the organization of the Intelligence Section.



The Intelligence Officer

The Intelligence Officer is one of the two supervisory officers on the staff of the Plans Chief, as shown by the line of authority chart, page 55 . He is in full charge of the Intelligence Section of the Plans Unit and is responsible directly to the Plans Chief for its efficient operation. He meets this responsibility by the prompt and timely performance of the number of duties among which are:

1. Direct and supervise the Fire Scouting job:
 - a. Determine scouting needs and information required (Essential Elements of Information).
 - b. Determine scouting methods which will most essentially provide this information.

- c. Determine available sources from which this information may best be obtained.
- d. Divide the fire area into scouting units and record these units on the Operations Map and each scout map.
- e. Brief all scouts and assign definite missions by:
 - (1) Brief all scouts on the general situation (Par. 1, Five-Paragraph Fire Order).
 - (2) State general scouting mission for all scouting units (Par. 2, Five-Paragraph Fire Order).
 - (3) State specific mission for each scout team and the Essential Elements of Information (E. E. I.) for that scouting unit (Par. 3, a,b,c, etc., Five-Par. Fire Order).
 - (4) State action each scout team will take on completion of present assigned mission (Par. 3x, Five-Paragraph Fire Order).
 - (5) State equipment, supply, transportation and ~~communication~~ which will be available to each scout team and how it may be obtained. (Par. 4, Five-Paragraph Fire Order).
 - (6) Issue clear and concise instructions on the ~~communication~~ procedure to be followed such as:
 - (a) Radio channels to be used and call signs authorized.
 - (b) Frequency of reporting and detail of report expected.
 - (c) Over-lays and sketches desired and how they are to be transmitted (Thrust Line)- Appendix (Page A-33

- (d) Procedure desired in use of written messages.
- (e) Drop-message procedure in the case of air scouts.
- (f) Synchronize watches to Fire Headquarters time.
- (g) Ask scouts if they have any questions.

(Par. 5, of Five-Paragraph Fire Order).

- f. Obtain equipment, supplies and transportation for scouts.
 - g. Give on-the-job training to scouts as required.
 - h. Inspect scouting job as conditions require.
 - i. Personally carry out such scouting missions of critical feature as conditions require or permit.
2. Train and supervise the Map and Record Clerk in setting up and maintaining the Operations Map and the Scout Log.
 3. Train and supervise the Weather Clerk in obtaining current weather forecast and fire danger data and in maintaining the Fire Weather Log.
 4. Review, summarize and evaluate scouting and weather information currently.
 5. Keep Plans Chief informed of the situation at all times by furnishing him with all summaries of evaluated information as well as all new items of information which have a special significance as applied to the fire or to the suppression action.
 6. Furnish sketches, over-lays and maps to other Units of the Fire Headquarters, as directed by the Plans Chief or provided by Unit Standing Operating Procedure (S.O.P.).

7. Prepare requisition for all maps required by the Fire Organization.
8. Establish Thrust-Line, key points on the fire edge or other special orientating data on all maps prior to issue.
9. Issue maps of the fire area on the basis of S.O.P. or as directed by the Plans Chief.
10. Coordinate Scout Log and message data with the Fire Log Clerk to insure complete Fire Log records.
11. Maintain contact with all elements of the Line Unit, either personally or through special scouts, to insure current information at all times as to progress of line construction, critical points, hot-spots, accurate location of control line, estimate of time required to control, etc.
12. Personally insure that the Operations Map is posted promptly with all of the latest information and is maintained neatly and accurately. This is the primary source of information for the Fire Boss and Top Staff and is usually the basis for all tactical and strategic plans.

In general the Intelligence Officer must insure the collection and evaluation of all available data pertaining to the fire and to the suppression project.

Intelligence Scout

The Intelligence Scout is responsible directly to the Intelligence Officer for carrying out the scouting missions assigned. He meets this responsibility by the timely performance of a number of duties among which are:

1. Receives briefing and assignment (Five-Par. Fire Order) from the Intelligence Officer, asking questions and making notes as necessary. He makes special note of the E.E.I. required for his zone of operation.
2. He obtains necessary equipment, supplies, transportation, etc. to do the job assigned.
3. He studies maps, aerial photos, and other available data and make such sketches or notations on his own map as are required to insure having all available information as a basis for his work in the field. If Thrust-Line is used he checks the plotting on his map against the Thrust-Line plotted on the Operations Map to insure accurate transmission of locations.
4. If the time and plane are available he makes an orienting flight over the fire prior to initiating ground scouting.
5. He proceeds on a scouting mission, utilizing all means of transportation and communication available which will speed up and facilitate his work.
6. He carries out his assigned scouting mission within his assigned zone of operation by noting, recording, mapping and reporting as scheduled to the Intelligence Officer all

information secured which should include:

- a. Location and behavior of fire edge, hot-spots, etc. Note whether smoldering, creeping, running or crowning.
- b. Location, size, behavior and potentialities of spot fires.
- c. Fuel types and hazards such as snag areas, slash areas, etc. in, adjacent to and ahead of main fire and spot fires. In all cases being sure to indicate the understory or ground fuels.
- d. Any improvements such as buildings, power and telephone lines, bridges, et cetera, threatened or destroyed by the fire.
- e. Weather conditions encountered on ridges, slopes, hollows, etc. such as wind, temperature, humidity and moisture condition of fuels as to whether wet, damp, dry, etc.
- f. Location of natural barriers such as rock slides, streams, bare areas, canyons, ravines, etc. which might be used as control lines. Indicate whether streams can be crossed by foot or by tractor.
- g. Location of any features not shown on maps, such as trails, roads, streams, springs, etc.
- h. Location of possible camp sites, aerial drop areas, and similar suitable sites for other special operations.

- i. Location of ridges or other likely control lines, showing steepness of slope, cover, soil condition, etc., indicating whether there are any barriers to tractors such as rocks, steep areas, etc.
- j. Indicate any special equipment needs.
- k. Indicate possible routes to various parts of fire edge or spot fires.
- l. Indicate possible escape routes or safety areas for crews, if needed.
- m. Report location of crews or dozers encountered, location of line construction, held line, control line, etc.
- n. Report immediately:
 - (1) Any condition requiring ~~immed~~iate attention such as fire endangering a crew, buildings, bridges, power or ~~comm~~unication lines or threatening to cut off routes of travel or trap travelers on highways, roads, etc.
 - (2) Any threat of conditions which might be remedied through ~~immed~~iate attention and prevent excessive work later, such as a spot fire far ahead of the ~~main~~ burn, a hot-spot threatening to cross a road or get into a snag area, a slash area, etc.

7. Employing methods in accomplishing the scouting mission which will insure personal safety such as:
 - a. Always keeping the location of escape routes in mind.
 - b. Avoid entering heavy slash areas or steep slopes directly ahead of the fire.
 - c. By always working with another scout in rough country or heavy slash areas.
 - d. By using care in handling and carrying edged tools.
 - e. By wearing proper clothing, shoes and hard hat.
 - f. By avoiding over-exertion and over-heating in steep or slash country.
 - g. By always carrying a first-aid kit and knowing how to use it.
8. Working with the Intelligence Officer and Map Record Clerk at the Fire Headquarters to insure completeness and accuracy of posting scouting information on the Operations Map. (See Fig. #17, page A-49).
9. Acting as a guide for control crews going into the country acouted.
10. Scouting routes to the fire edge in preparation for a night attack and acting as a guide to conduct night crews into the locations scouted.
11. Acting as an emergency road guide for truck convoys at points where confusion of proper route is possible. This should be considered an emergency use of scouts who should be replaced by other personnel at the first opportunity.

12. Acting as an emergency messenger where delivery of messages of an emergency nature to crews in poorly marked or uncertain areas is necessary and a high level of skill in woodsmanship and cross-country traveling is required. This is also an emergency use of Intelligence Scouts.

The Intelligence Scout is the eyes of the Fire Boss and a key position on the Fire Team. On his ability to secure accurate detailed information rapidly, by use of plane, vehicle, horse or foot travel, and to transmit the information secured to the Fire Headquarters in brief, clear, concise and accurate messages, depends the availability of proper information upon which the Fire Boss and his Top Staff can build strategic and tactical plans for the efficient control of the fire.

Map and Record Clerk

The Map and Record Clerk is responsible directly to the Intelligence Officer for preparing and maintaining the Fire Operations Map (See Appendix Page A49, Fig. #17) and the Scout Log. He prepares maps, overlays and sketches as directed by the Intelligence Officer, maintains a file of the Intelligence Section copies of all scout messages, checks with the Fire Log Clerk at frequent intervals to insure that scout information of importance to the over-all fire is properly recorded in the Fire Log, and assists the Intelligence Officer as directed.

The Weather Clerk

The Weather Clerk is directly responsible to the Intelligence Officer for securing and recording all possible information and predictions regarding weather conditions in the general fire area which will in any way affect the behavior of the fire or the plans for and progress of the suppression effort.

The Weather Clerk meets this responsibility by taking prompt and timely action in the execution of the number of duties among which are:

1. Establish contact with local weather bureau, airports, fire danger stations, and the Fire Dispatcher's office and schedule listening periods to radio weather broadcast on various radio channels for the purpose of obtaining all possible weather information.
2. Obtain and record in the Fire Weather Log all possible information pertaining to weather conditions, present and predicted, which may in any way affect the weather in the general fire area.
3. Operate a Fire Danger Station at Fire Headquarters to supplement other general weather forecast and reports and correlate them with actual fire weather conditions on the immediate scene of the fire.

4. Compute and maintain a continuing record of Cumulative Fire Danger Index for the immediate area and keep the Intelligence Officer advised promptly of all changes and trends.
5. Furnish the Information Officer with copies of all Fire Weather Log entries together with brief summaries of forecast and predictions at frequent intervals or as provided by Unit S.O.P.

In general the Weather Clerk is responsible to the Intelligence Officer for obtaining, recording and summarizing all possible weather information, forecast and predictions which apply in any way to the general weather zone in which the fire is located. Weather is a basic factor in forest fire control. Only by having complete weather information the Fire Boss and the Top Staff formulate adequate control plans and make necessary revisions to meet changing wind and weather conditions and thus secure the early extinguishing of the fire.

THE RECORDS SECTION

The Records Section is one of the two Sections of the Plans Unit.
(See Chart page 55)

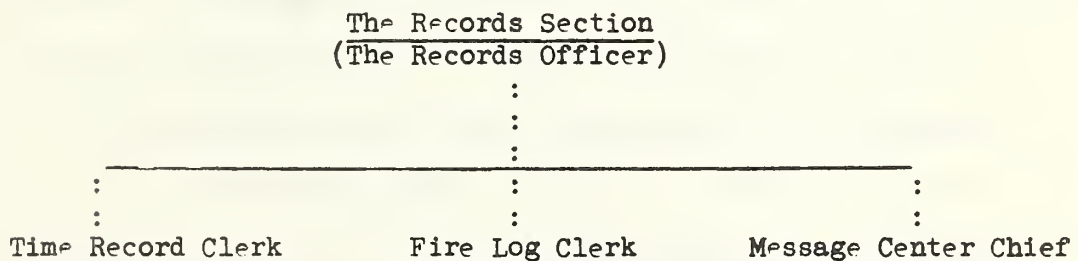
The functional responsibilities of the Records Section are twofold:

1. To maintain an adequate accurate current record of all activities pertaining to the fire and to the suppression effort.
2. To operate a Message Center for the entire Fire Organization.

The Chief of the Records Section is the Records Officer. He is assisted in handling the jobs of the Records Section by subordinates designated respectively as:

1. The Time Record Clerk.
2. The Fire Log Clerk.
3. The Message Center Chief.

The relation of these positions to each other and to the Records Officer is illustrated by the line of responsibility chart below:



Records Officer

The Records Officer is responsible directly to the Plans Chief for compiling all records pertaining to the action of the fire and to the resources available to control it.

He meets this responsibility by the timely execution of a series of duties which may include:

1. Determine personnel and equipment requirements of the Records Section and submit to the Plans Chief.
2. Organize, brief, train, direct and supervise personnel of the Records Section to insure the efficient fulfilment of the functional responsibilities of the Records Section.
3. Arrange for the registration of all incoming and outgoing personnel and special equipment.
4. Insure that adequate time records for all personnel, special equipment and animals are initiated promptly and accurately maintained throughout the life of the suppression project.
5. Arrange to insure the handling of all clerical work as directed by the Plans Chief.
6. Complete in final form written instructions, plans and fire orders from rough draft or notes as directed by the Plans Chief.

7. Arrange for the reproduction and distribution of all written instructions, plans and orders as directed by the Plans Chief.
8. Prepare and distribute organization charts, organization shift maps showing disposition of resources, and personnel rosters as directed by the Plans Chief.
9. Prepare, reproduce and distribute summary reports of the suppression effort, at intervals prescribed by the Plans Chief or by Unit S.O.P., including:
 - a. Chronology of the fire and suppression action occurring since the last report (based on the Fire Log).
 - b. Maps showing perimeter of the fire and status of control, by 12 hour periods since the last report (provided by Intelligence Section).
 - c. Predicted weather for the immediate area including:
 - (1) Wind direction and velocity.
 - (2) Burning Index, current and predicted.
 - (3) Cumulative Fire Danger Index, current and predicted.
(From Intelligence Section).
10. Assemble all regular administrative reports from the elements of the Fire Organization and summarize, as directed by the Plans Chief.
11. Prepare all administrative reports for higher authority, based on data furnished by other elements of the Fire Organization, as directed by the Plans Chief.

12. Handle the assembly of data, preparation, reproduction and distribution of the final fire report, assisted by all elements of the Fire Organization and supervised by the Plans Chief.

The Records Officer is the Chief Clerk for the Plans Chief and, in this capacity handles much of the administrative "paper work" for the entire Fire Organization. The maintenance of clear and accurate records of the fire suppression project, involving labor and equipment time records calling for the expenditure of large amounts of public funds, is a matter of great responsibility. During the progress of the suppression effort resource data maintained by the Records Section furnishes an important basis for strategic control plans. At the close of the suppression project personnel and equipment time records must pass a fiscal audit for compliance with the legal requirements of the public agency handling the fire. A well informed and experienced Record Officer is required to meet these responsibilities.

Fire Log Clerk

The Fire Log Clerk is responsible directly to the Records Officer for the maintenance of a clear, concise and accurate chronological record of all important actions and events of the fire and of the suppression force.

The Fire Log Clerk meets this responsibility by the timely performance of the number of duties which include:

1. Initiate the Fire Log in the approved form starting with the appearance of the fire and continuing through the close of the suppression effort.
2. Maintain the Fire Log by current entries which must be brief, clear and concise and complete as to date, time and facts.
3. Obtain data for the Fire Log by a series of actions which include:
 - a. Continuing review of the Message Log and Message file in the Message Center.
 - b. Periodic review of the Fire Operations Map, Scout Log and the Fire Weather Log which are maintained by the Intelligence Section.
 - c. Prompt review of all summaries, estimates of the situation, fire orders and reports prepared by the various Staff Sections of the Fire Headquarters.
 - d. Personal contacts and interviews with the Fire Boss, Unit Chiefs and other Staff personnel of the Fire Headquarters.

The maintenance of a clear, concise and accurate Fire Log is a necessary part of a successful suppression project. Such a Fire Log can be obtained only through the constant efforts of a Fire Log Clerk

who is alert, conscientious and who has the ability to determine which items and events are of such an importance to the record as to justify entry in the Fire Log.

Time Record Clerk

The Time Record Clerk is responsible directly to the Records Officer for the proper registration of all personnel arriving and departing from the fire and for maintaining a proper time record of all personnel and special equipment employed on the suppression project.

The Time Record Clerk meets this responsibility by the performance of a number of duties which may include:

1. Determine equipment, supplies and personnel required to handle the registration and time records jobs and submit the request for it to the Records Officer.
2. Plan and execute the registration and time-keeping job to insure:
 - a. That all arriving and departing personnel are registered by name, address, time and business on the fire.
 - b. That all incoming labor, supervision and special equipment are classified and assigned promptly on arrival on the fire and that each individual time record is initiated and maintained.

- c. That all departing personnel and special equipment are registered out and that their time records are closed and acknowledged.
3. Prepare and maintain rosters and organization charts on a current status throughout the fire.
4. Prepare and maintain current summaries of personnel, by job classifications, by man hours, cost and by such other categories as the Records Officer may direct.
5. Train, inspect and supervise the work of such additional time-keepers as may be employed.
6. When requested conduct training for Crew Bosses in preparing and handling the Daily Crew Time Records.
7. Organize, inspect and supervise the handling of commissary items and posting of commissary charges to the individual time records.
8. Prepare and submit payrolls and records of special equipment rental as directed by the Records Officer.
9. At the close of the fire suppression project prepare a final summary of all labor, supervision and equipment rental by time and cost as a basis for compiling the final time report.

On nearly every fire the labor and supervision cost comprises a major part of the total suppression cost. Only through the action of an aggressive and able Time Record Clerk can proper costs be accurately determined and the payment of funds substantiated for audit. The job

of Time Record Clerk is one of great financial responsibility which should be assigned only to personnel familiar with the time keeping and payroll regulations and procedures of the public agency handling the suppression job.

Message Center Chief

The Message Center Chief is responsible directly to the Records Officer for the efficient organization operation of the Central Communication Center for the entire fire suppression project. (See chart, page 71).

The Message Center Chief meets this responsibility by the timely execution of the number of duties which may include:

1. Evaluate, in coordination with the Communication Officer (Service Unit), the communication needs of the Fire Organization Communication Center as to type, volume and frequency of messages to be handled.
2. Determine the Message Center requirements in personnel, equipment and supplies to meet the above communication traffic load and advise the Records Officer of these needs.
3. Organize, train, direct and supervise Message Center personnel to the end that the Message Center fulfill its functional responsibility of efficient, prompt and accurate handling of all types of communications within the Fire Organization.

4. Coordinate the operation of the Message Center closely with the Communication Officer (Service Unit) to the end that a minimum of communication equipment is employed at the Message Center and that it is maintained in serviceable operating condition at all times.

The Message Center is the nerve center of the communication system of the Fire Organization. On its efficient operation on a 24-hour per day basis depends the prompt and efficient operation of the Fire Organization. The proper functioning of the Message Center, as well as the amount of service it renders the Fire Organization, is largely dependent on the ability of the Message Center Chief to organize his personnel and equipment into a smoothly functioning team which can operate in harmony with the other Units of the Fire Organization.

S U M M A R Y S T A T E M E N T

Plans Unit

The complete organization and line of responsibility of the Plans Unit is presented in diagrammatic form in Fig. #4, page 81.

The Plans Unit, is one of three primary Units of the Fire Organization (See diagram, page 6) and has two principal functional responsibilities:

1. To collect, record, evaluate and distribute all information which can be obtained relative to the fire and to the suppression effort.
2. To act as an Operation Center for the Fire Organization.

The extent to which the combined action of the three Units of the Fire Organization is correlated in applying the suppression resources to the fire will be determined largely by the effectiveness of the functioning of the Plans Unit.

ORGANIZATION CHART - THE PLANS UNIT

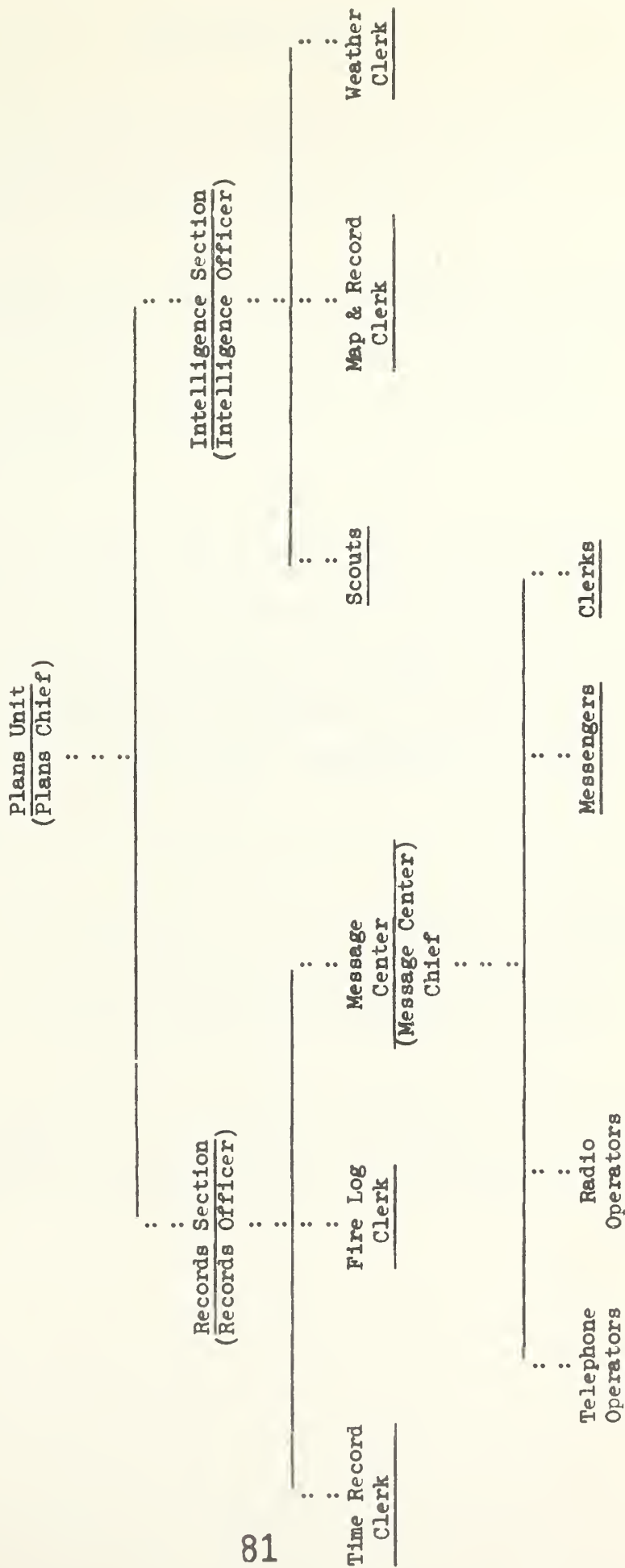


FIG. #4

THE SERVICE UNIT

The Service Unit is one of the three primary Units of the Fire Organization (see organization chart page 6).

The Service Unit has the functional responsibility for supplying all services and facilities required to equip, supply and maintain the Fire Organization throughout the entire period of operation of the suppression project.

The Chief of the Service Unit, designated as the Service Chief, is responsible directly to the Fire Boss (chart, page 6) for the proper and efficient functioning of his Unit in fulfilling its functional responsibility of supplying the requirements of the Fire Organization for transportation, communication, supplies, and camp management.

In applying the principles of good job management the Service Chief segregates the jobs of the Service Unit into several job-groups, designated as Sections, and places a subordinate in charge of each.

These Sections and their respective responsible officers are:

1. The Motor Equipment Section -- Motor Equipment Officer.

The Service Chief must be an extremely capable individual if he is to successfully administer the operations of the Service Unit. He must know and be able to apply the principles of good organization and management to the operation of his Unit. He must be familiar with service and supply planning and procedure. He must have a good working knowledge of Fire Organization and the requirements of a fire suppression project in operation. He must have the ability to keep many jobs operating at the same time without becoming involved in the details of any. He must be able to anticipate accurately, well in advance of actual need, the requirements of the Fire Organization and arrange to meet these needs at the time they arise with the proper types, sizes and amounts and without excessive waste or over-supply. Above all he must possess the ability to work agreeably with others under the stress and pressure of a tense fire situation without antagonizing his associates or losing his own perspective.

The Service Chief is responsible directly to the Fire Boss for functioning in two primary roles:

1. The role of Chief of the Service Unit.
2. As a member of the Top Staff of the Fire Organization.

The Service Chief meets these responsibilities by the timely execution of a series of duties among which may be included:

1. As Chief of the Service Unit:

- a. Determine personnel and equipment requirements of the Service Unit and request their assignment from the Fire Boss.
- b. Organize, train and supervise the personnel of the Service Unit in a manner to insure its effective operation.
- c. Determine initial and maintenance requirements of the elements of the Fire Organization plan for their procurement, delivery and distribution.
- d. Determine procurement and distribution "Lag Time" for the various classes of supply and establish "Level of Supply" to insure continued availability without excess surplus on hand.
- e. Schedule replacement of all classes of supply based on:
 - (1) Estimated consumption rate.
 - (2) Normal "Lag Time" between requisition and actual delivery.
- f. Anticipate special equipment and supply needs well in advance of their actual use, and, after correlation with using Units, recommend their procurement to the Fire Boss. (Headlights, outboard motors, road maintenance equipment, etc.).
- g. Handle procurement of special equipment required as directed by the Fire Boss, (bulldozers, plows, special pumps, planes, etc.).

That by inspection and conference that motor transportation equipment is adequate, suitable to the job, and dispatched and maintained in a manner to insure a maximum transportation service for the minimum number of motor units.

- i. Determine, through conference with other Units personal inspection and supervision, that communication facilities on the fire are adequate, properly distributed and maintained and are providing satisfactory service throughout the Fire Organization.
- j. Determine, through personal inspection and conference, that supply is adequate and distribution prompt for all items required by the Fire Organization.
- k. Determine, through personal estimate of the supply and transportation situation, requests of other Units, or direction of the Fire Boss, the need for aircraft by the Fire Organization and, where being used, if the efficiency of aircraft operation would be increased by activating the Air Operations Section.
- l. Determine, when aircraft are being employed, if the scheduling, maintenance and use is organized to insure maximum effectiveness of the equipment in operation.
- m. Determine, through personal inspection, conference with other Units and general supervision, the adequacy, proper organization and operation, and general efficiency of the Fire Camp system.

- n. Take prompt and decisive action to correct any deficiencies in planning, operation, supervision or training disclosed by personal inspection or reliable report.
- o. Correct, through on-the-job training, all deficiencies in planning, supervision or operation on the part of the Section Chiefs.
- p. Insure through training, inspection and supervision at all levels that special emphasis is placed on safety practices, equipment and training and that adequate first-aid facilities are always available in the Fire Camp and on the line.
- q. Determine, through personal supervision and inspection, the need for redistribution of equipment and supplies to insure their most efficient use.
- r. Make continuing inspections, both personally and through Section Chiefs, of all equipment and tool maintenance to insure proper mechanical operation, condition and storage as well as to insure maximum safety to using or operating personnel.
- s. Maintain an accurate current record of all equipment and supplies arriving on the fire, their assignment or distribution, and any replacement, maintenance or loss.

- t. Maintain accurate, current summaries of equipment and supplies on hand, on order, and consumed as a basis for advance planning, stock level information and cost summaries.
- u. Maintain accurate current data (supplied by Plans Unit) of total number of personnel on the fire, by assignment as a basis for planning supply and commissary requisition and replacement.
- v. Insure by inspection that all supervisory personnel of the Service Unit are alert at all times to the possibility of release of any type of equipment or supply and that such release is recommended promptly to the Fire Boss for his approval.
- w. Correlate closely at all times with the Fire Boss and other Unit Chiefs as to equipment and supply needs, increased or reorganized service needs, failure on the part of Unit personnel to function in harmony with supervising personnel of other Units or any similar source of discord or lack of cooperation within the Fire Organization which might originate with the Service Unit. Prompt and decisive action to correct or eliminate any such deficiencies must be taken.
- x. Work closely with the Plans Chief in the development and execution of the plan of demobilization of the Fire

Organization at the close of the suppression project operation. Such a plan must include:

- (1) Safe transportation of personnel home bases.
- (2) Reconditioning and return of equipment to the home base or owner.
- (3) Return, distribution or storage of unused supplies.
- (4) General clean-up and police of the fire area with special emphasis on camp sites, motor parks and storage areas.
- (5) Salvage of worn out tools, equipment and telephone lines.

y. Prepare a final report and summary of cost of all items handled by the Service Unit to serve as a portion of the basis of the final fire report.

z. Attend and participate in the Board-of-Review covering the fire and the operation of the suppression project.

2. As a member of the Top Staff:

- a. Attend and participate fully in all Top Staff conferences.
- b. Be prepared to present at any time in clear, concise and logical form and sequence the most current information relative to the equipment, supply and service resource of the Fire Organization and the ability of the Service Unit to support current and prospective tactical or strategic plans.

- c. Be prepared to present, on request, recommended plans for the Service Unit support of proposed or current operations of the Fire Organization (transportation, communication, supply, air operation or camp management).
- d. Participate in the detailed planning of the suppression operation with the Fire Boss and other members of the Top Staff.

The proper and timely supply, maintenance, feeding and housing on a fire suppression project is an important determining factor in the efficiency and success of the suppression effort. Only through the untiring efforts of an experienced Service Chief can such service support be rendered the Fire Organization.

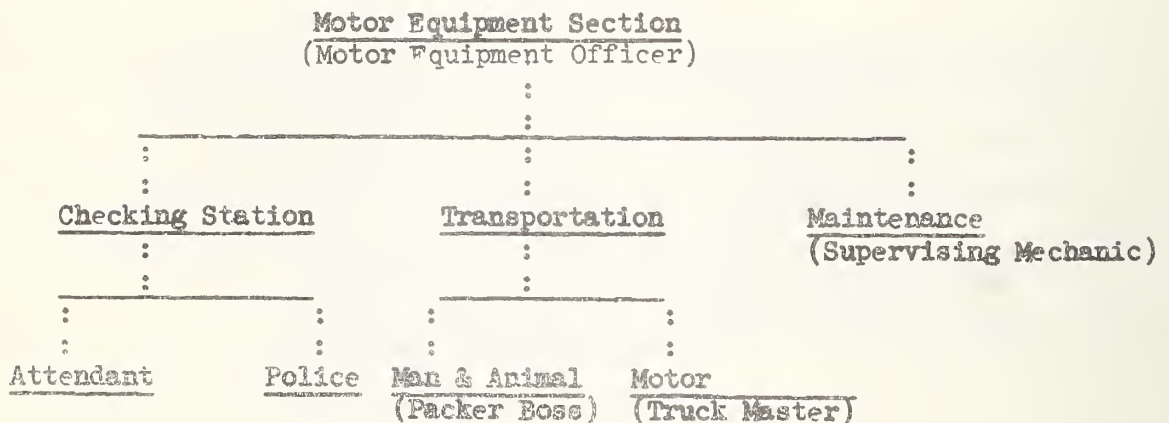
THE MOTOR EQUIPMENT SECTION

The Motor Equipment Section is one of the five operating Sections of the Service Unit (See chart, page 84). This Section has the functional responsibility of facilitating the operation of the entire Fire Organization through the efficient operation and maintenance of all motor equipment used on the suppression project.

The Chief of the Motor Equipment Section, designated as the Motor Equipment Officer, is responsible directly to the Service Chief (See chart, page 84) for the efficient organization and operation of his Section to the end that it may meet its full responsibility as a member of the Service Unit Team.

In organizing his Section the Motor Equipment Officer applies the principles of good job management by dividing the work of the Section into several job classes and delegating the responsibility and authority for handling such jobs to the personnel in charge of each sub-section.

The organization of the Motor Equipment Section, together with the line of responsibility of the sub-sections to each other and to the Section Chief, is shown by the diagram below:



The job of the Motor Equipment Section is to insure that all elements of the Fire Organization are furnished sufficient motor equipment (transportation equipment, line building equipment, power pumps, power saws, outboard motors, etc.) to complete the job at hand and that such equipment is operated and maintained in a manner to insure efficient performance of the job, continued functioning, and safety to the operators and to others working in conjunction with it.

The Motor Equipment Officer

The Motor Equipment Officer is responsible directly to the Service Chief for the over-all coordination, management and maintenance of all motor equipment and transportation facilities assigned to the fire.

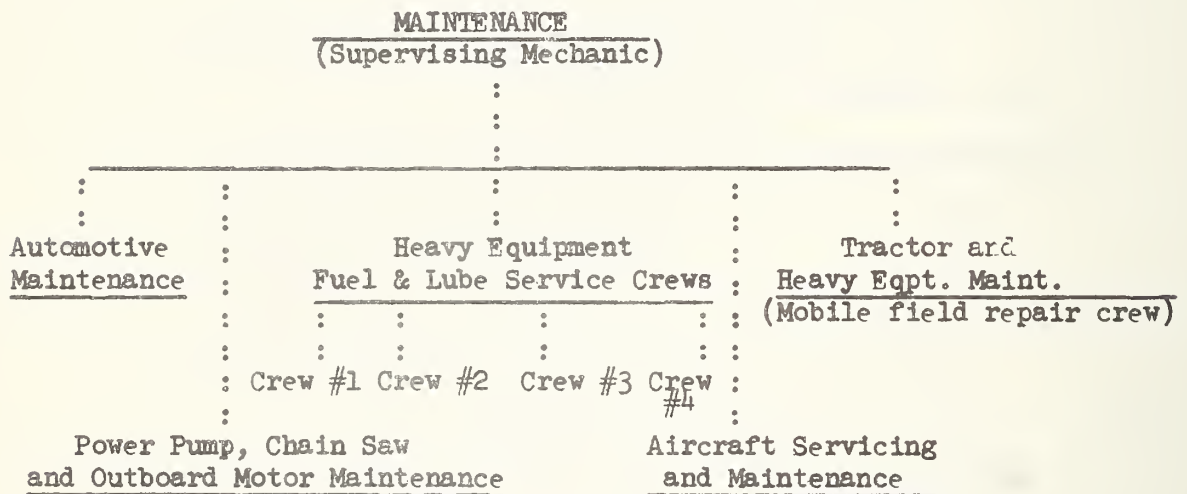
He discharges this responsibility through the timely performance of the number of duties which may include:

1. Determine, through conference with Service Chief and from personal knowledge, the motor equipment and supply requirements of the Fire Organization and request this equipment and supplies from the Supply Officer in accordance with S.O.P.
2. Determine personnel requirements, by skill classes, necessary to operate the Motor Equipment Section efficiently and request qualified personnel to meet these requirements from the Service Chief.

3. Organize, train and supervise the personnel of the Motor Equipment Section in a manner to insure its continued effective and efficient operation.
4. Determine, from the Service Chief, the location designated for the checking station of the Fire Headquarters and arrange to initiate its operation by:
 - a. Select, assign and brief personnel
 - b. Schedule hours of duty and prepare roster of shifts.
 - c. Arrange for on the job of feeding, as necessary.
 - d. Request assignment of State Police (from Service Chief).
 - e. Request that communication be established from the Checking Station to the Message Center (from Communication Officer).
 - f. Coordinate the operation of the Checking Station with the Plans Chief (as the Fire Operations Officer).
5. Determine transportation requirements of all elements of the Fire Organization and outline and initial transportation plans for the approval of the Service Chief.
6. Place the approved transportation plan into operation by:
 - a. Organize transportation equipment and drivers into a motor pool with a Truck Master in charge.
 - b. Set up a dispatching system under the Truck Master, to include a dispatch log, trip ticket operation, individual vehicle record of fuel, lube and maintenance, and a schedule of driver assignments and shifts.

- c. Arrange for an initial safety and mechanical check of all transportation equipment (mechanics) and a schedule of inspection and maintenance for each piece of such equipment.
 - d. If conditions require back packing to complete transportation of equipment and supplies to fire line crews, organize a Packing Crew under a Packer Boss and arrange a schedule of operation.
 - e. In coordination with the Plans Unit prepare and secure approval of a Traffic Circulation Plan for the fire area, to include the best and safest routes to key points on the fire, one-way roads showing the direction of travel, load limits and clearance on bridges, etc., maximum speeds and similar important information. Arrange with the Plans Unit for the preparation, distribution and posting of Traffic Circulation Maps.
7. Through the Service Chief determine requirements of the Line Unit for power-line-building equipment, pumps, chain saws, etc., and arrange for securing them, together with sufficient trained operators and maintenance personnel to permit continuous operation if required.
8. Organize the operation of motor equipment in coordination with the using elements of the Fire Organization.

9. Organize and operate all activities pertaining to aircraft until such time as the Air Operation Section is activated.
10. Determine motor maintenance requirements of the Fire Organization as to type, volume and time limitations and prepare a motor maintenance plan for the approval of the Service Chief.
11. On approval by the Service Chief activate the motor maintenance plan by:
 - a. Organize the maintenance sub-section to efficiently handle the maintenance load in keeping with the analysis of maintenance requirements. On a complex project the organization might be as follows:



- b. Insure, through frequent on-the-job inspections, that all motor equipment is being maintained to a standard to insure proper and continued satisfactory functioning. Insist on a high standard of preventative maintenance.
12. Determine by careful analysis the initial and the operating requirements for fuel, lube, repair parts, tools equipment and supplies required by the Motor Equipment Section and advise both the Service Chief and Supply Officer of these requirements in writing, listing all requirements in detail as to item, type, kind or grade, quantity or number, etc., and include the estimated rate of consumption for each.
13. Prepare, and maintain on a current basis through the operation of the suppression project, a detailed accurate record of all motor equipment on the fire by type, make, size and assignment. Also maintain an accurate summary of these data for the use of the Fire Boss and Top Staff in operational planning.
14. Make frequent inspections of all elements of the Motor Equipment Section to insure that personnel are properly organized, trained in their job and operating smoothly as a team.
15. Take prompt and decisive action to correct any deficiencies in planning, operation, supervision or training disclosed by personal inspection or reliable report.

16. Conduct on-the-job training of subordinates whose operations indicate a lack of experience in doing their assigned job, and insist on this practice at all levels.
17. Insure, through training, inspection and supervision at all levels, that special emphasis is placed on safety practices, training and equipment and that first-aid equipment is readily available at all times.

The general efficiency, and sometimes the success or failure, of the fire suppression project is heavily dependent upon the efficiency and reliability of operation of its motor equipment. Only through the well planned operations of an aggressive and experienced Motor Equipment Officer can the motor equipment on a fire contribute its maximum to the suppression effort.

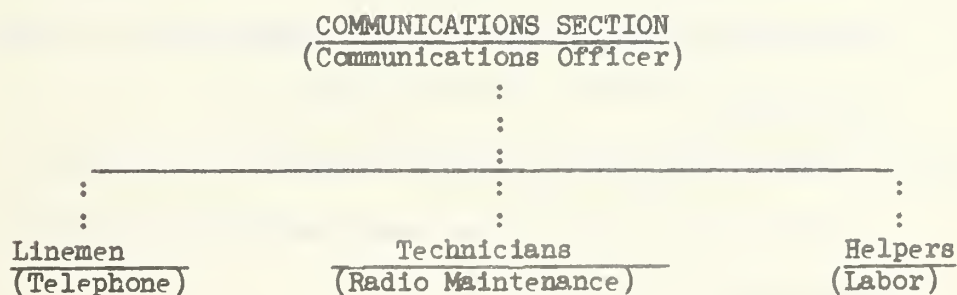
THE COMMUNICATIONS SECTION

The Communications Section is one of the five operating Sections of the Service Unit (see chart page 84). Its functional responsibility is to establish and maintain a communication system for the Fire Organization commensurate with the communication requirements of the fire situation.

Operational experience has indicated that the operators of communication equipment should be members of the Unit or Section using the communication equipment rather than members of the Communication Section.

The Chief of the Communication Section, designated the Communications Officer, is responsible directly to the Service Chief for the efficient operation of his Section in fulfilling its functional responsibility.

In addition to understanding the technical phases of communication equipment the Communications Officer must have sound and practical knowledge of the communication requirements of a fire suppression project and of the various means by which they can be met. He must know from experience where field telephones and emergency wire will provide better communication than radio, the capability and limitations of radio in the field, where and when relay sets are required and practical means of keeping radios and telephones in operating condition under heavy fire use. While many times a Communication Officer will handle most of the work of his Section personally it will become desirable, on large and complex suppression projects, to develop and train an organization similar to the one diagrammed below:



The Communication Officer

The Communication Officer is responsible directly to the Service Chief for the establishment and maintenance of a communication system throughout the entire fire project area commensurate with the practical communication needs of the suppression force.

The Communication Officer serves in a dual role:

1. As Chief of the Communication Section.
2. As a Special Staff Officer for communication planning.

A Communication Officer discharges these responsibilities by the timely execution of the number of duties which may include:

1. As a Special Staff Officer for communication planing:
 - a. Determine communication needs of the entire suppression project by conference with Unit Chiefs and review of the fire situation.
 - b. Make specific recommendations to the Fire Boss and the Top Staff as to:
 - (1) A plan to secure the most complete communication coverage of the fire area possible with the communication equipment now on hand.
 - (2) A plan of expansion to provide adequate communication coverage of the entire fire area together with specific data as to:

- (a) Additional communication equipment and supplies required.
 - (b) Personnel and transportation needed to install additional facilities.
 - (c) Additional personnel and equipment required to maintain the additional facilities.
 - (d) Estimated time required to complete the full installation.
- c. Continue, throughout the full period of the suppression operation, to prepare and present for approval changes and improvements to the Communication Plan which will render better communication service to the suppression organization and secure more efficient use of communication equipment.
- d. Inspect the employment and operation of communication equipment by the using Units, Sections and individuals and present recommendations for the correction of inefficient practices noted to the Fire Boss and to the Top Staff.
2. As Chief of the Communication Section:
- a. Determine the communication requirements of the Fire Organization and the communication equipment and supplies required to meet the need of the approved Communication Plan.

- b. Prepare, in close cooperation with the Supply Officer, itemized requisitions for equipment, tools, supplies and replacement parts required to establish and maintain the approved communication system for the fire area.
- c. Determine personnel and transportation requirements necessary to operate the Communication Section and request their assignment from the Service Chief.
- d. Install and maintain communication equipment to a standard which will insure continuous and satisfactory functioning.
- e. Prepare and maintain currently, in close cooperation with the Plans Unit, a communication map, showing location of equipment, and a communication chart showing (diagrammatically) the technical hookup of the Communication Operations Plan. Distribute, post and maintain as directed by the Service Chief.
- f. As requested, conduct training (by class and on the job) for operators of communication equipment for all Units and at all levels.

The prompt and efficient control of the widespread Fire Organization is largely dependent on good and reliable communication with all elements of the suppression force. Only through the employment of the technical knowledge and practical field experience of an efficient Communication Officer can such a communication system be developed and

maintained to a standard which will insure reliable and adequate communication throughout the period of operation of the suppression project.

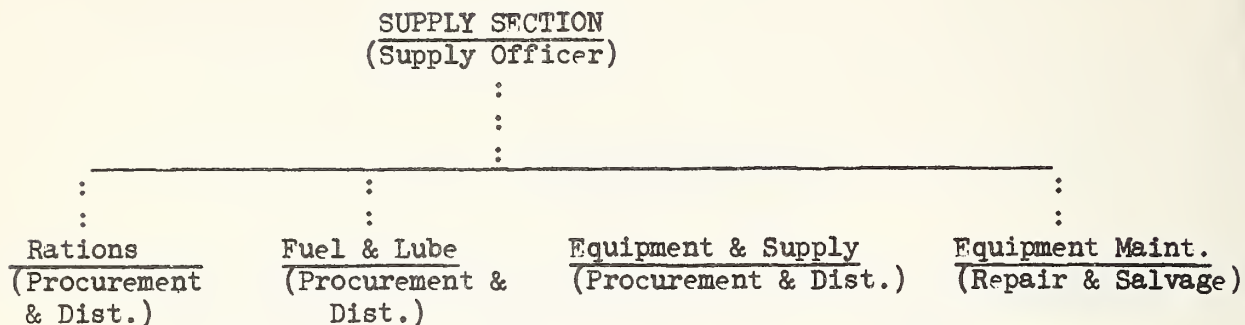
THE SUPPLY SECTION

The Supply Section is one of five Sections of the Service Unit (see chart, page 84). The functional responsibility of the Supply Section is the support of the operations of the Fire Organization by the procurement and timely distribution of all items of equipment and supply required by the suppression force in controlling and extinguishing the fire.

The Chief of the Supply Section, designated as the Supply Officer, is responsible directly to the Service Chief for the efficient organization and operation of the Supply Section to the end that it fully meet its assigned functional responsibility.

In applying the principles of good job management of the organization and operation of his Section the Supply Officer divides the workload of the Section into several job classes and organizes his personnel and facilities on the basis of handling these job classes. On a complex

suppression project the organization of the Supply Section might be as follows:



The Supply Officer

The Supply Officer is one of the five Section Chiefs on the Staff of the Service Chief. He is responsible directly to the Service Chief for the efficient planning, procurement and distribution of all equipment, supplies and services required by the Fire Organization in controlling and extinguishing the fire.

He discharges this responsibility by the timely performance of a number of duties which may include:

1. Determine the personnel and equipment requirements of the Supply Section and request their assignment from the Service Chief.
2. Organize, train and supervise the personnel of the Supply Section in a manner to insure its efficient operation and maximum contribution to the support of the suppression effort.

3. Determine, through requisition from all elements of the Fire Organization, conference with Unit and Section Chiefs, and personal estimate based on knowledge and experience, the initial and maintenance equipment, supply and service requirements of all elements of the Fire Organization.
4. Plan for the procurement and distribution of the above items.
5. Determine the procurement, delivery and distribution "time lag" for the various items of equipment and supply and recommend, for the approval of the Service Chief a "level of supply" for the various classes, to be maintained on hand at the Fire Camp to insure the continued and uninterrupted supply of these items to the suppression force.
6. Plan and schedule replacement of all classes of supply based on:
 - a. Rate of consumption.
 - b. "Time lag" between requisition and actual delivery on the fire.
7. Maintain an accurate current summary of equipment and supplies on hand, on order and consumed as a basis for advance planning, stock level information and cost summaries.
8. Establish a standard procedure for submitting requisitions and requests for equipment, supplies and replacement as a part of the S.O.P. of the Fire Organization.
9. Prepare, for the approval of the Service Chief, a supply plan for the fire based on the above factors as correlated with the actual fire situation and revised currently as needed to correlate with the major changes as they occur.

10. Supervise and direct the procurement of equipment and supplies by:
 - a. Determine current requirements through requests from all elements of the Fire Organization supplemented by personal knowledge and experience.
 - b. Review requests with a view to:
 - (1) Check for completeness as to:
 - (a) Items.
 - (b) Size, grade, quality, specifications, etc.
 - (c) Number or quantity.
 - (2) Check for actual need of the items to do the job.
 - (3) Check for conformance to policy, standards, instructions, menus, etc.
 - c. Consolidate requests into requisitions, complete as to detail and specifications, with special comments explaining need for unusual items.
 - d. Forward requisitions to the Fire Dispatcher, or other procurement agency as set up by S.O.P.
 - e. On delivery of items check in detail with the requisition, noting shortages, overages or important deviation from specifications or amounts.
11. Supervise and direct the distribution of equipment and supplies to insure conformance to requests and equity of distribution.

12. Anticipate special equipment and supply needs well in advance of their actual use, and after correlation with the using elements, recommend their procurement to the Service Chief.
13. Handle the procurement of special equipment as directed by the Service Chief (bulldozers, pumps, planes, tractor lights etc.)
14. Procure and maintain an adequate supply of motor fuels and lubricants and set up a procedure for their distribution based on:
 - a. Facilities for supplying gasoline and oil direct to vehicles by the operation of a "camp gas station".
 - b. Procedure for providing 55-gal. drum deliveries of fuel and lube to the Equipment Field Service Crews.
 - c. Arrangements for providing fuel for power pumps, chain saws and outboard motors, ready mixed and in plainly marked 5-gallon containers suitable for back packing.
 - d. Providing kerosene and white gasoline for use in lanterns and lamps in small, plainly marked containers.
 - e. Provision for an accurate and detailed record, maintained currently, of all fuel and lube received and distributed.
15. Procure and maintain a supply of hand tools and small equipment, assembled by logical units, with facilities for issue and turn-in by shifts, as prescribed in S.O.P. and covered by adequate accountability records.

16. Determine commissary needs and present recommendations as to items, stock level to be maintained and procedure for handling, to the Service Chief for approval. On approval procure commissary stock and issue it to the Records Officer who will handle the individual issue and posting of charges to the time records through his time-keepers. Procedure must include adequate accountability records for the Supply Section.
17. Arrange for the prompt reconditioning of tools and small equipment maintained in stock or returned for repair.
18. Arrange, through the Service Chief, for the prompt salvage and turn-in of all equipment broken or worn out on the job. Provide for inspection of all material turned in and the reconditioning of such items wherever possible.
19. Schedule periodic procurement of food based on:
 - a. Number of men to be fed (ration strength).
 - b. Standard menus and grocery order (see appendix).
 - c. Level of supply to be maintained (S.O.P.)
 - d. "Lag-time" on requisitions.
20. Consult with other Section Chiefs and technical personnel as to specifications and amounts of all replacement and repair items prior to ordering to insure suitability to the job at hand.

21. Determine, through conference with personnel of other Units and Sections, whether or not supply is adequate, timely and distributed to the best advantage of all elements of the suppression force.
22. Determine, through personal inspection, conferences and general observation that all elements of the Supply Section are functioning in an efficient and productive manner.
23. Insure through training, inspection and supervision, at all levels, that special emphasis is placed on safety practices, equipment and training and that adequate first-aid facilities are always available to personnel of the Supply Section.
24. Take prompt and decisive action to correct any deficiencies in training, planning or operation within the Supply Section as disclosed by personal inspection or reliable report.
25. Conduct on-the-job training for Supply Section personnel as a means of correcting deficiencies in knowledge and experience on the job assigned.
26. Maintain accurate records of all tools and equipment received on the fire, their assignment or distribution, and any replacement maintenance and loss (work closely with the Records Officer).
27. Maintain accurate current data (supplied by the Plans Unit) of the total number of personnel on the fire, by assignment, as a basis for planning supply and commissary replacement.

28. At the close of the suppression operation:

- a. Recondition all tools and equipment and arrange for their return to the home base or to storage.
- b. Prepare a summary report of all operation of the Supply Section throughout the operation of the suppression project, including final balances of commissary items and supply cost as a basis for the preparation of the fire report.

Without an adequate and timely supply of all of the items necessary to equip and maintain a Fire Organization engaged in the operation of a suppression project, all planning and effort on the part of the supervisory and working personnel will accomplish little towards controlling and extinguishing the fire in an efficient manner. To equip and maintain such an organization with the proper items in adequate amounts at the right time requires organization, planning and the know-how of practical experience which a good Supply Officer must possess if he is to meet his responsibilities of adequate supply support of the suppression project.

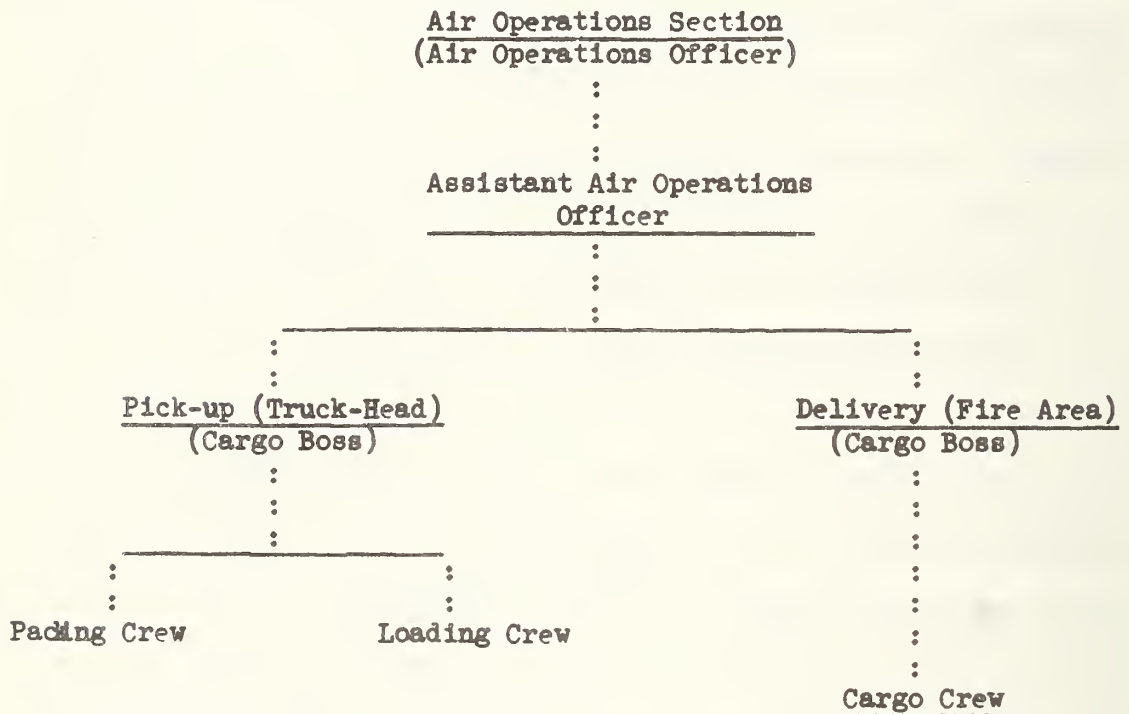
THE AIR OPERATIONS SECTION

The Air Operations Section is one of the five Sections of the Service Unit (see chart, page 84). It has the functional responsibility of planning, coordinating and executing control and use of aircraft for observation, communication and transportation of personnel and cargo in support of the fire suppression project.

Under conditions where the use of aircraft is limited to one or two small planes whose principal job is observation, the functional responsibility of this Section is usually assumed by the Motor Equipment Section as a part of the transportation job. As the use of aircraft on a suppression project exceeds the small scouting job and begins to involve the transportation of personnel and cargo, it has been found most expedient to activate the Air Operations Section of the Service Unit and to delegate to this Section full responsibility for aircraft employment as a part of the suppression project.

The Section Chief, designated as the Air Operations Officer, is responsible directly to the Service Chief for the planning, coordination with other elements of the Fire Organization, in proper execution of all operations within the suppression project involving the use of aircraft. Most of the planning and supervisory work of this Section

is handled by the Air Operations Officer personally. However, when the air job involves the transportation of personnel and cargo between the truck-head or rail-head in the fire location, he may have need for an Assistant Air Operation Officer, a packing and loading organization at the pick-up end and an unloading crew at the delivery point, particularly when part of the cargo involves air drop. These crews are activated as needed and promptly deactivated when no longer required. On a complex fire involving air delivery of cargo from a truck head to the fire area the organization of the Air Operations Section might be:



The Air Operations Officer

The Air Operations Officer is the Chief of the Air Operations Section and is directly responsible to the Service Chief for the efficient operation of his Section in the complete fulfilment of its functional responsibility.

The Air Operations Officer meets this responsibility by the timely performance of a number of duties which may include:

1. Determine type, amount and frequency of aircraft use required to adequately support the suppression operation.
2. Determine the number and type of aircraft which will best meet the requirements of the job and recommend their procurement to the Service Chief. On approval work with the Supply Officer in contracting services of suitable aircraft.
3. Determine personnel, equipment and supply requirements of the Air Operations Section and request their assignment from the Service Chief.
4. Organize, train, direct and supervise the personnel of the Air Operations Section in performing the work of the Section to an acceptable standard.
5. Plan, in coordination with the Plans Chief and his Staff, the use of aircraft for:
 - a. Aerial scouting of the fire area.

- b. Orientation flights over the fire for ground scouts, supervisory personnel and representatives of higher headquarters.
 - c. Delivery of important messages to crews out of reach of normal communication facilities.
6. Plan, in coordination with the Service Chief and his Staff, the use of aircraft for:
- a. Air transportation of:
 - (1) Incoming suppression crews.
 - (2) Emergency evacuation of sick and injured.
 - (3) Cargo of all types.
 - b. Air delivery, by air drop or by water landing, of food, equipment, supplies and motor fuel to isolated crews not accessible to other means of transportation.
7. Prepare, for approval of the Service Chief (and Fire Boss), an Air Operations Plan covering the coordination of the use of aircraft on the fire with other suppression activities. Such a plan should be prepared in sufficient detail as to guide all Units in their use of aircraft, indicate aircraft services available and, in general, insure that the Air Operations Section contributes its maximum to the success of the suppression effort.
8. Direct and supervise the operation of the Air Operations Section by:

a. Thorough briefing of all personnel of the Section on their jobs and on safety practices to be followed and enforced, such as:

- (1) Danger from propellers on conventional aircraft and tail and main rotors on helicopters.
- (2) Keep unauthorized personnel away from aircraft, particularly helicopters.

Special Note: More persons are injured and killed annually by the tail rotors of helicopters than from all crashes and other accidents in helicopter operations combined.

- (3) Proper loading of cargo in aircraft to come within limits of weight and balance of specifications.
- (4) Proper fastening of cargo in the aircraft to prevent shifting or breaking loose in flight.

b. Preparation of flight schedules

c. Thorough briefing of pilots on:

- (1) The fire situation. (Plans Unit may be requested to conduct situation briefing and furnish pilots with maps, overlays or sketches.)
- (2) The jobs to be handled by aircraft.
- (3) Flight schedules and specific assignments.
- (4) Orientation as to landing and take-off areas such as:

- (a) Location of most suitable areas (marked on maps).

- (b) Hazards such as wires, high obstructions, soft runways, rocks and in float operations, rocks, logs, etc., in the landing area.
- (5) Location of aircraft fuel dumps and facilities for repair and inspection of aircraft.
- d. Check pilot and aircraft qualifications such as licenses, liability insurance and agreement for contract under which they are operating on that particular fire.
- e. Organize ground crews to handle cargo or passengers promptly, efficiently and safely at both pick-up and delivery points.
- f. Arrange with the Supply Officer for the establishment of fuel and lube dumps, of proper types and grades, as required by the operation (based on coordination with pilots).
- g. Arrange with Supply Officer for facilities for maintenance and minor repairs to aircraft (as required by the situation).
- h. Arrange with Plans Chief for pilots to be furnished aircraft weather reports periodically with special reports covering sudden changes in the weather forecast situation.
- i. Supervise the preparation of landing and take-off areas including:
 - (1) Clear water or runways of obstacles, fill holes, etc.

- (2) Provide wind indicators (if required).
 - (3) Set up fuel dumps and instruct ground crews on refueling procedure.
 - (4) Provide docking facilities for water landing sites.
- j. Secure through the Supply Officer, aircraft equipment required for the operation such as cargo nets and similar "tie down" equipment, cargo air drop equipment including parachutes, containers, identification streamers and ground markers.
 - k. Secure, through the Communications Officer, radio equipment tuned to the fire frequencies to insure communication and control of aircraft at all times.
 - l. Supervise the loading and unloading of personnel and cargo from the aircraft.
9. Set up and maintain a dispatching system for aircraft together with provisions for complete records of:
- a. Scheduled flights
 - b. Log time of aircraft and pilots.
 - c. Cargo tonnage moved by air.
 - d. Personnel, by numbers and weight, moved by air.
 - e. Such other records as may be required by the Plans Unit, or by other Sections of the Service Unit.
10. Make periodic inspections of all phases of the air operation to insure that personnel are qualified and are performing their assigned jobs efficiently.

11. Take prompt and decisive action to correct any deficiencies noted in the operation of the Section as disclosed by personal inspection or by reliable report.
12. Insure, through training, inspection or supervision that special emphasis is placed on safety practices, equipment and training and that adequate first-aid facilities are available to all personnel at all times.
13. Coordinate all operations closely with the Service Chief and make a special effort to insure that he is fully informed at all times as to the operation of the Air Operations Section and plans for its future employment.
14. Maintain accurate current summaries of the aircraft, equipment and supplies on hand or available for use as well as summary data on current operations as a basis for advanced planning and cost summary.
15. Remain constantly alert to the possibility of release of any personnel, equipment or supply and insure that such release is recommended promptly to the Service Chief.
16. At the close of the suppression project prepare a complete report on the operations of the Section, including detailed data as to:
 - a. Period of operation.
 - b. Aircraft used by type and number
 - c. Missions flown, by types.
 - d. Personnel and cargo carried, by number and weight.

e. Fuel and lube consumed.

f. Estimated cost.

This report to be a part of the basis for the complete fire report.

The function of the Air Operations Section of the Service Unit is to centralize the responsibility for the planning and control of all aircraft used on the fire in one place and thus insure sound planning, close coordination between employment of aircraft and the control plan, and the efficient use of aircraft without duplication of air effort or excessive standby time.

The job of the Air Operations Officer demands that he have a good background knowledge of flight experience to insure an understanding of the capabilities and limitations of various types of aircraft and their performance limitations, with relation to weather, visibility, terrain, etc., as a basis for scheduling landings on remote lakes, streams or emergency landing strips and similar operational missions. He must also know something of cargo loading of aircraft because of weight and balance limitations which are critical from the standpoint of operational efficiency and safety. A knowledge of the air stability of various types of planes will permit scheduling priority under adverse weather conditions. In general, the Air Operations Officer must have a sound knowledge of aircraft operational problems, or an

able assistant who does, if he is to successfully administer the Air Operations Section of the Service Unit.

THE CAMP SECTION

The Camp Section is one of the five Sections of the Service Unit (see chart, page 84). This Section is given the functional responsibility of feeding, housing and insuring the general welfare during off duty periods of all personnel of the Fire Organization.

The Chief of the Camp Section, designated as the Camp Boss, is responsible directly to the Service Chief for insuring adequate feeding, housing and medical attention for all personnel of the Fire Organization. He normally accomplishes this job through the establishment of a Base Fire Camp, and as many secondary or fly camps as the situation demands, at which a field mess is set up, blankets and sleeping accommodations provided, and all necessary sanitary facilities made available. In most cases the Fire Headquarters is established directly adjacent to the base fire camp but not in it as it has been found through experience that the activities of the two establishments cannot be closely intermingled efficiently.

In organizing his Section the Camp Boss applies the principles of good job management by dividing the work of camp establishment and operation into job classes and organizing his facilities and personnel on the bases of these job groups. The organization of the Camp Section, in a relatively complex fire suppression situation, might be as follows: (See chart, page 84, Fig. #5)

The Camp Boss

The Camp Boss is one of the five Section Chiefs on the Staff of the Service Chief. He is directly responsible to the Service Chief for the efficient organization and operation of his Section to the end that it fully meet the functional responsibility assigned in an efficient manner.

The Camp Boss meets this responsibility by the timely performance of a number of duties among which may be included:

1. Determine, through discussion with Service Chief and Plans Unit staff, the feeding and housing requirements of the Fire Organization.
2. Determine, on the basis of the above requirements and general fire situation, the personnel, equipment and supply requirements of the Camp Section and request the assignment of these resources to the Camp Section from the Service Chief.

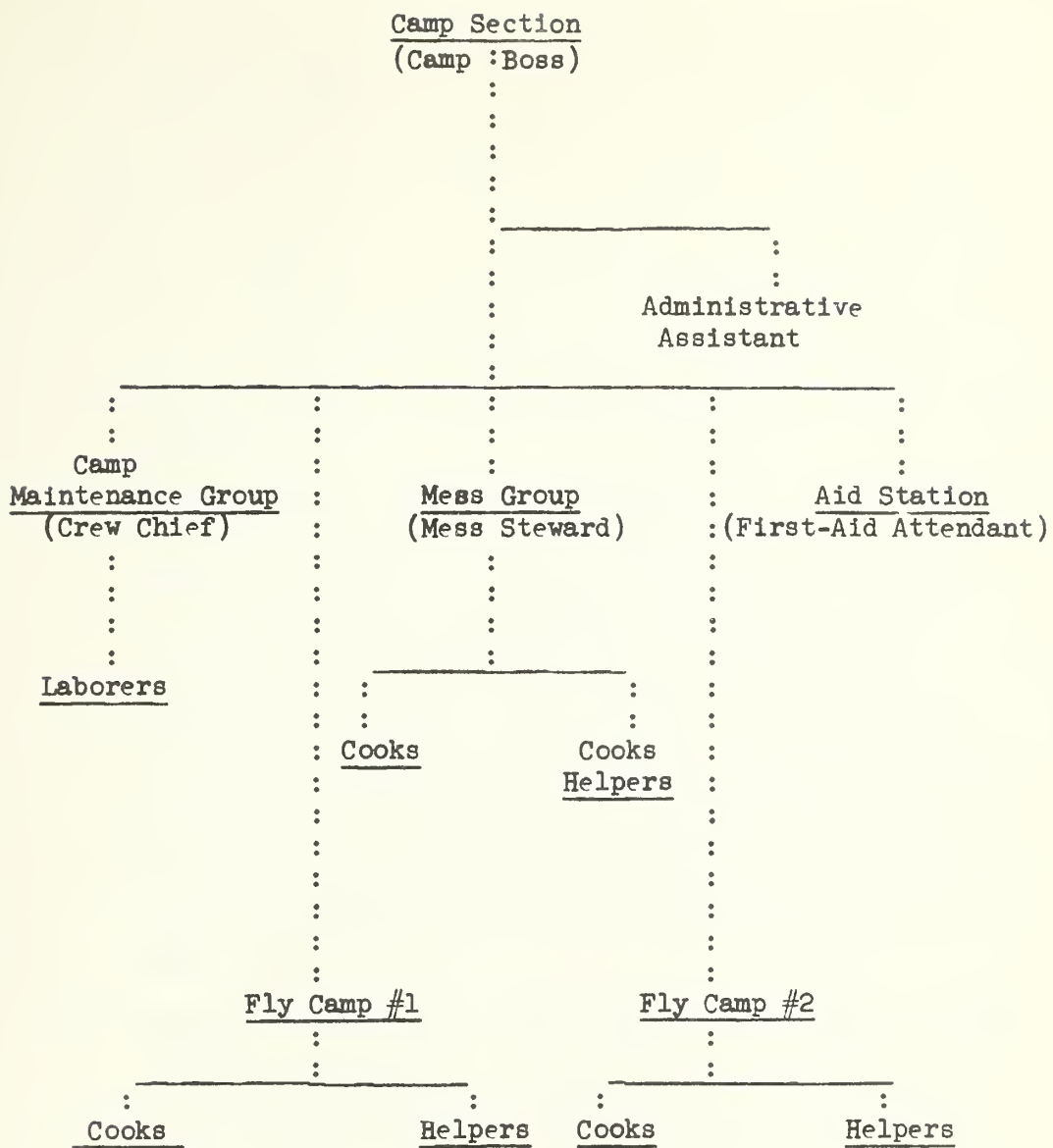


FIG. #5

3. On selection of the specific site for the Base Fire Camp by the Service Chief (and approval by the Fire Boss) prepare a detailed sketch or diagram of the proposed camp layout (see appendix, Fig. #18, page A61) and submit it to the Service Chief for approval.
4. Check the water supply carefully for adequacy, purity and potability and set up necessary safeguards to insure against contamination.
5. Establish and operate a Base Fire Camp by:
 - a. Brief all personnel of the Camp Section on the general situation, camp layout and plan of camp operation.
 - b. Set up the camp installations and initiate operation.
 - c. Set up (in close coordination with the Records Officer) a roster of all personnel to be housed at the Fire Camp, by crew assignment, and maintain this roster on a current basis.
 - d. Prepare a schedule of camp operation and, after approval by the Service Chief, post copy on the camp bulletin board and furnish copies to the Service Chief, Plans Unit, Line Unit and Fire Boss. Brief all Crew Bosses on the camp routine and their part and responsibility in maintaining it.
 - e. Supervise the organization and mobilization of crews for each shift in accordance with shift plans and schedules.

The actual dispatch of these crews will be by schedule or according to camp S.O.P.

- f. Prepare a camp circulation plan or "flow chart" for incoming and outgoing crews, post on camp bulletin board and set up the flow channels by means of signs, posts and string rope or wire. (See sample diagrams, appendix, page A-63).
- g. Prepare necessary signs and plainly mark all camp installation such as day and night sleeping areas, kitchen and serving tables, designated eating areas, garbage pits, latrines, wash racks, time-keepers' tables, tool racks, loading areas, assembly areas, etc.
- h. Prepare and post on the bulletin board the camp rules for guidance of off duty personnel in the use of camp facilities.
- i. Inspect the camp mess daily to insure:
 - (1) That food and supply requisitions are prepared by the Mess Steward in detail following the standard menus and standard grocery lists, with items and amounts based on number of personnel to be fed (ration strength). Insure that requisitions are submitted to the Supply Officer promptly and sufficiently in advance of actual need to permit procurement and delivery of these items based on the Supply Officer's estimate of "time lag".

- (2) That the kitchen is arranged for efficient work and ready access of personnel to the serving tables (diagram of kitchen layout in appendix, Fig. #19, page A-65).
- (3) That cooks maintain sanitary conditions, both in person and in all phases of food preparation and serving.
- (4) That standard menus are being followed and that the food items served are in accordance with the menu for that day for which the proper food items and amounts were requisitioned.
- (5) That the food is adequate, well prepared and cleanly and efficiently served.
- (6) That the storage of food items is handled in a manner as to prevent theft, contamination or spoilage.
- (7) That the eating areas are supervised to insure that garbage and dishes are placed in receptacles provided, not left on the area.
- (8) That garbage and eating utensil receptacles are placed in locations handy to the eating area.
- (9) That hot coffee is available to off shift personnel at all times.
- (10) That clean, fresh, cool water is available in the Fire Camp at all times and to all personnel

(11) That cooks and helpers hours of work are scheduled by definite shifts and that such schedules are posted in the kitchen area.

(12) That field lunch requisitions by crews, numbers, and location, are made available to the kitchen force and that the Mess Steward has set up a standard procedure for handling lunch preparation and delivery to the line (arrange with Camp Boss and Motor Equipment Officer) at the proper time and in the proper amounts.

Note: Improper handling of field lunches, in amounts, quality, and time of delivery is usually one of the principal bases of dissatisfaction of personnel in a large fire camp.

- j. Inspect wash racks and latrines to insure adequate facilities for number of men using them, proper sanitation, that they are plainly identified by signs and that a definite schedule for their maintenance and inspection has been set up.
- k. Inspect day and night sleeping areas for suitability of location, availability of blankets, general police, sanitation and maintenance.
- l. Inspect the First-Aid Station to insure that the Attendant is competent to administer first-aid, that adequate first-aid equipment is available (including stretchers and wire

splints to immobilize broken bones) and that a plan for securing priority in transportation and communication to handle emergency cases has been worked out, approved by the Service Chief, and that all concerned are familiar with it.

- m. Consider, periodically, the overall camp situation and continually strive to determine ways and means of improving the contribution of the Fire Camp system to the support of the suppression operation and the general welfare of personnel involved.
- 6. Establish and operate fly camps as directed by the Service Chief. Follow the same general procedure as a Base Camp only on a smaller scale. In some cases the Sector or Division Boss will also act as Camp Boss for fly camps.
- 7. Insure through training, inspection and supervision that special emphasis is placed on safety practices, equipment and training and that adequate first-aid facilities are always available to all personnel in and about any of the Fire Camps.
- 8. Maintain accurate current summaries of equipment and supplies on hand, on order, and consumed as a basis for advanced planning stock level information and cost summaries.
- 9. At the close of the suppression project or at any time that a camp is deactivated a complete report of the operations and activities of that camp should be prepared, including a detailed record of all equipment and supplies received,

disposition of equipment, supplies consumed and an inventory of remaining stocks. This report must be complete as to detail and cost estimates as it will form part of the basis of the final fire report.

To a large measure the morale of the personnel on a fire is influenced by the facilities available at the Fire Camp and by the manner in which the camp is operated. In order to establish and operate a Fire Camp which provides a maximum of service to all personnel with a minimum of inconvenience, including adequate, tasty food and relatively clean surroundings, a Camp Boss must have a good knowledge of field camp operation and supervision. To a large extent the morale of the fire fighters is determined by how well he does his job.

S U M M A R Y

The Service Unit

In the preceding pages we have discussed the details of the organization of the Service Unit. Now let us review it briefly as a whole.

The Service Unit, as the name implies, is organized to handle all problems of supply and service for all elements of the Fire Organization:

equipment, supplies, maintenance, food, shelter, communication, transportation and first-aid medical service. It is organized into five Sections, each of which is assigned the handling of specific job-classes. The purpose of such organization is to eliminate confusion and duplication of effort as well as to definitely fix the responsibility for providing each class of service, facilitate planning and increase the efficiency and speed of providing the necessary support to the Fire Organization.

The organization of the Service Unit, showing the relation of the various sections to each other and to the Service Chief, as well as indicating line of responsibility, chain of authority, and general correlation of the service support as indicated in the chart, Fig. #6, page 133 .

Motor Equipment Section (Motor Equipment) Officer	Communication Section (Communication) Officer	Supply Section (Supply Officer)	Air Transport Section (Air Transport) Officer	Camp Section (Camp Boss)
Checking Transp. Motor Eqpt. Station Maintenance	Rations Fuel & Lube Supply	Eqpt. & Tool Maint.	Camp. Maint.	Mess
1st Aid				
Linemen (Telephone)	Technicians (Radio Maint.)	Helpers (Labor)	Ass't. Air Transport Officer	
Pickup (Truck Head) (Cargo Boss)				Delivery (Fire Area) (Cargo Boss)

133

THE OPERATION OF THE FIRE ORGANIZATION

A Forest Fire Control Agency is comparable in many ways to a standing army. In each case the organization is authorized by law and supported by public funds. In return the public expects prompt and efficient action on the part of each to defend them from forest fire or enemy attack. In both cases the forces involved are composed of a small, well trained and equipped corps of "regulars" with plans for a rapid expansion in times of emergency through the use of partially trained and equipped "reserves", "volunteers" and other private citizens. In both cases it is the responsibility of the "regular" organization to equip, and weld into a homogeneous team, these auxiliary resources to the end that the common danger is met and defeated in a minimum of time, at a minimum loss of life and property and at a minimum expenditure of public funds.

To meet this challenge a public agency charged with responsibility of forest fire control must prepare, through careful and efficient planning, adequate training of its own forces as well as those of "reserves" or "volunteers", and the acquisition and careful distribution of sufficient equipment and supplies to permit operation of

adequate forces under emergency conditions for a time sufficient to insure the procurement of additional supply replacement.

An example of the kind of situation a fire control organization must be prepared to meet is afforded by a fire which occurred in San Diego County, California, August 1950, which demonstrates the magnitude of the conflagration fire-fighting job, in size and complexity of force, required to establish control. This fire required six days for control and burned 63,000 acres--nearly 100 square miles. In the first day the fire covered 14,000 acres with a perimeter of 30 miles. In one other period of about 12 hours the fire burned over 23,000 acres, adding many miles of perimeter of control. The ultimate perimeter of the fire was 87 miles, of which only 25% could be controlled by direct attack. The remaining 65 miles of perimeter had to be controlled indirectly by back firing.

The management principles and important elements of action in forest fire suppression are basically the same as those applicable in any construction project. The major difference is the time element. Efficient suppression of forest fire requires a "right now" use of well planned, well directed energy of men and machines. A fire job calls for faster analysis, development and application of an action plan than is necessary on a road construction or a similar job. On these jobs there is usually time for a full-dress review of plans before action starts. If a mistake is made today, it can be corrected

tomorrow without "losing your shirt". With a fire job, "tomorrow" is entirely too late.

The Fire Boss must know the principles of man and machine management, the techniques of fire suppression and the factors which influence fire behavior. Further, he must have the ability to act promptly and decisively. It is his job to develop a workable plan and an organization to execute it. His organization must have the flexibility to adjust to a rapidly changing problem and to go into action in a minimum of time. His job is not one of sitting in the Fire Camp as a swivel-chair general. To make it possible for him to be an active front-line planner and leader, he must have a Staff available to free him from details.

The real measure of success of the Fire Boss is his ability to adjust plans and "cash in" currently on up to date line information. He must be able to evaluate quickly, changes in wind, humidity and cover, and direct the suppression action accordingly. He must be alert and on-the-job.

To insure the efficient management of a fire suppression organization it is essential that it is operated in conformity with certain fundamental principles of good job management which include:

1. Unity of command.

- a. Each individual in the Fire Organization must know to Whom he reports, Who reports to him, and his definite responsibility and authority
- b. Each individual in the Fire Organization must report to only one superior.

2. Span of control

- a. Numbers. There is a practical limit to the number of units one person can direct. He should not have more people, animals or machines working than he can adequately supervise.
- b. Distance. The one who directs work must be close to those directed. The distance factor on fires will vary with the transportation and communication available.
- c. Time. Decisions must be made as to when work is to be done. Orders must not be processed through too many hands. There must be prompt, complete and on the line acceptance of responsibility with no "buck passing".

3. Homogeneous assignment

- a. Functions must not overlap between individuals. One individual should have some knowledge of the function of those working with him.
- b. Definition of functions must be specific and clear cut.
- c. Every function must be assigned to some individual. One individual may have several functions assigned to him on

the smaller fires. Give men a full job, then assign extra help as needed.

- d. Avoid overstaffing; far better to overload a few competent men slightly than to waste the "line" competence of several men by creating an underloaded "full dress" staff.

4. Delegation of authority.

- a. The responsibilities assigned must be supported with full authority to act. Clearly define the type of action on which each level of boss (Sector Boss, Crew Boss, etc.) is free to use his own authority and that which requires approval of his immediate superior.
- b. Do not retain sole decision authority at the top.
- c. Limit the number of delegations to those essential to the current needs of the job.

The plan of organizing a fire suppression project is based upon the principles that there must be:

- 1. Definite channels of command.
- 2. Clear cut definition of duties.
- 3. A positive distribution of these duties among the command in clear-cut, unmistakable language. (See the Five-Paragraph Fire Order - Appendix - Page A-35).

The basic things that need to be known about and done on a fire are the same whether it be large or small. They are:

1. Obtain knowledge of all factors that will affect the spread of the fire.
2. Knowledge of the control technique to apply.
3. Assembling men and equipment on the job in adequate quantity.
4. Directing and supplying these forces to the end objective.

The primary difference between a large fire and a small one is the number of people required to accomplish the tasks. The overhead organization for a particular situation should not be larger than that required by the job to be done.

In the previous sections of this manual we have reviewed in detail the organization of a fire suppression project together with the duties and responsibilities of the component parts of the Fire Organization. Before proceeding with the details of the operation of the Fire Organization on a suppression project a brief summary of the organization as a whole may serve to help draw these individual parts together into a composite picture of the working unit.

The primary characteristics of the Fire Organization may be enumerated as follows:

1. Insures organization of the job according to a definite pattern with which all personnel are familiar.

2. Insures that the job is organized for efficient operation in accordance with the basic principles of good job management.
3. Provides a maximum of flexibility which permits employment on fires of any size and character.
4. Lends itself to training of new personnel and analysis of application under any given set of conditions.

The operation and control of this organization is based on the following principles:

1. Character and degree of build-up are based on NEED.
2. Delegation of responsibility, and with it necessary authority, is standard practice.
3. Unity of Command is maintained at all times and at all supervisory levels.
4. Specific job assignments at all levels are a must.
5. Span of Control, based on numbers, time and distance, is carefully considered in making job assignments.
6. Supervision, including inspection and on-the-job training, is a basic requirement of every supervisory job at all levels.

This organization is sufficiently flexible to permit its employment on any class of fire under any condition. No organization operates better than the operating ability of the personnel that man it.

Top Staff positions must be filled with the best qualified men available if we expect to realize maximum efficiency from the fire suppression team. Each individual must be carefully selected for the particular job to which he is assigned and afforded the opportunity of training in that position through at least one field problem if his initial functioning under actual fire conditions is to meet a minimum satisfactory standard.

Consider briefly the key positions in the Fire Organization.

THE FIRE BOSS must be a good organizer and administrator in addition to being experienced in fire suppression. He may have Staff advisors but not an alternate. He, alone, must bear the full responsibility for the suppression action.

THE LINE BOSS should be the best qualified and most experienced fire suppression individual available. He must be a good supervisor with plenty of drive and on-the-ground "know-how" to get the job done.

THE PLANS CHIEF must know staff operation and techniques as well as have a thorough knowledge of the fire suppression job. He must be able to organize and supervise many jobs of detailed work. He must have the ability to evaluate information in terms of its influence on the fire suppression operation and to present it to the Fire Boss

and Staff in a brief, clear and logical manner. He must also have ability as a coordinator or manager as he must serve as the Fire Operations Officer who actually operates or manages the entire fire headquarters in his role of "Adjutant" or business manager for the Fire Boss.

THE SERVICE CHIEF must be an experienced organizer, planner and "expediter" as well as have a good knowledge of fire suppression organization, operation and requirements. He must have the ability to keep many jobs operating at once without becoming involved in the details of any. He must have the ability to anticipate requirements well in advance and to arrange for meeting them without excessive waste or over-supply. Above all he must have the ability to work agreeably with others under the stress and pressure of a tense fire suppression situation without losing his perspective.

ESSENTIAL ELEMENTS OF MANAGEMENT

If the fire team is to function efficiently in the suppression effort its pattern of operation must conform closely to the Essential Elements of Management which include:

1. Policy and Standards

The policies of the Fire Boss must be stated early in the

suppression operation and all subsequent action planned and supervised in compliance therewith. Standards of performance are established early in the operation.

2. Obtain Facts

Early and continued securing of accurate operating information is essential.

3. Analyze

Accurate analysis and evaluation of information is essential to successful and efficient planning.

4. Plan

Specific action plans are a must in the achievement of efficient suppression action. Such an advance plan will include:

- a. What is the problem?
- b. What resources are available to meet it?
- c. Where will it be met?
- d. When will it be met?
- e. When will it be solved?
- f. How will it be solved?
- g. What is the alternate plan in event of change?

5. Organize

Assign personnel to the jobs for which they are best qualified. Administrative rank must be disregarded.

6. Direct

Issue clear-cut orders in writing. Inspect to insure they are carried out according to established policy and standards.

7. Train

On-the-job training by supervisory personnel must fill the gap in previous training and experience of subordinates.

Here leadership ability is essential to success.

8. Control

Check performance against standards. Take prompt and firm correction action in all cases of sub-standard performance.

Do not fail to recognize outstanding performance.

9. Coordinate

Insure through planning, inspection and supervision that manpower, overhead, and equipment are in balance with essential requirements and working smoothly to a common objective.

10. Employee Relations - Morale

- a. Insure that the welfare and personal problems of all personnel are considered and adequately met.
- b. Maintain discipline, both individual and organizational.
- c. Insist that supervisory personnel fully meet their responsibilities.
- d. Take prompt corrective action on all violation of rules and instructions.
- e. Maintain morale by keeping all personnel informed of the progress in the control of the fire as well as of interesting events which occur on the job and in their home area.

11. Safety

Develop a safety plan early and push it vigorously throughout the operation.

FIRE ORGANIZATION BUILD-UP

We have reviewed briefly the Organization, Staff and Management information previously presented. Let us put them together and see how they work in practical application.

First let us discuss "delegation of jobs" and "build-up". We recognize that the Fire Boss is responsible to higher authority for all activities on the fire to which he is assigned and must handle all supervisory jobs not specifically delegated. In the early stage of the suppression effort he may personally handle all of the supervisory jobs (Chart I, Fig. #7, page 151). As the suppression force and area of operation increases it becomes difficult for him to personally supervise actual on-the-line work of all crews so he delegates this job to three Straw Bosses, still handling all overhead jobs of Crew Boss and above (Chart II, Fig. #8, page 153).

As the Fire Boss estimates the situation it becomes apparent that the fire will require a considerably larger force than is at hand to

control it. In anticipation of this he requests additional resources and expands his organization (Chart III, Fig. #9, page 155). Here we find the organization framework beginning to take form. Portions of all three Units have been activated. In anticipation of an expanding effort he has delegated the on-the-line supervision job to a Line Boss (who also acts as Sector Boss) to leave himself free to direct the expansion of the suppression organization and to plan the overall control effort. He is handling the Plans Unit and has established a Radio Operator (the first element of the Message Center) and Scouts (the initial element of the Intelligence Section). He is also handling the job of the Service Chief and has designated a Motor Equipment Officer to handle all transportation equipment now on the fire and due to arrive.

In Chart IV, Fig. #10, page 157, we find the Fire Boss has continued to expand his organization. The Line Unit has developed three fully manned Sectors. A Plans Chief has been designated and is handling all of the jobs of the Plans Unit (with the exception of Message Center and Scouts). A Service Chief has been designated and the Service Unit expanded. Note that the Supply Officer is also handling the job of Camp Boss.

The Fire Boss has now delegated the detailed job to his Staff and is in a position to Plan, Supervise and Direct the operations on his fire. Should the need develop he can easily expand any or all of his Units to meet the increased load.

Chart V, Fig. #11, page 159, gives us the organizational picture late in the suppression job. The Mop-up stage has been reached. The Plans and Service Units have been withdrawn and all Line Unit supervision above Crew Boss released. The Fire Boss is again handling all jobs on the fire above Crew Boss.

The above discussion illustrates the flexibility of the Fire Organization. It is expanded to meet the requirements of the situation and as rapidly reduced as these needs cease to exist. It is just as important that the Fire Boss anticipate in advance the possibility of reducing his force, plan such reduction and release personnel and equipment promptly, as it is for him to anticipate his build-up needs.

Another phase of the operation of the Fire Organization is that of "Combined Staff Action". Early in the suppression operation the Fire Boss will outline certain procedures he would like followed within the Fire Headquarters under normal conditions. These are usually developed as the result of experience on other fires and are designed to simplify and streamline staff action. Such procedure is known as "STANDING OPERATING PROCEDURE" and referred to as "S.O.P.". In general it is a working relation between the members of a headquarters, or within an organization, which has developed through practice. Combined Staff action usually results from a good S.O.P.

As an example of combined Staff action let us consider a situation where the Fire Boss, on the recommendation of his Staff, has made the decision to establish a fly-camp of 50 men on the opposite side of the fire from the Base Fire camp for the purpose of reducing travel time of mop-up crews on that Sector.

Immediately following the Staff meeting each Unit Chief consults with his Unit Staff as to requirements and available resources. The Unit Chiefs then meet and, through discussion, agree on the details. In the event they cannot agree on certain details, or the decision involves questions outside their authority, the questions are referred to the Fire Boss for decision. Following this agreement other lateral Staff action takes place between such elements as:

1. Supply Officer and Camp Boss.
2. Fuel and Lube Service Crews and Fuel & Lube Procurement.
3. Motor Equipment Officer & Camp Boss.
4. Records Officer and Camp Boss.
5. Sector Boss and Camp Boss.
6. Service Chief and each of his Section Chiefs, etc.

Once these details are decided the three Unit Chiefs meet, summarize the arrangements, which the Plans Chief records in the form of a rough-draft order, and present the plan to the Fire Boss for approval. On his approval the plan is issued as an order (Five-Paragraph Fire Order,

Appendix, page A-35) with copies to all concerned. The Fire Boss and each Unit Chief then determines, by inspection and supervision, that the camp is established according to plan.

Fire Organization Build-up Charts

The following charts show one type of build-up of a fire organization as the size of the fire and suppression force increases, and partial demobilization as control of the fire is secured.

They emphasize the following points:

1. Elements of the supervisory overhead are added as needed to maintain control of the suppression force.
2. In the early stages the Fire Boss and Unit Chiefs handle all of the jobs under them not assigned. These jobs are filled as soon as the supervising officer anticipates the need for that element will arise in the near future (a few hours).
3. The size of the Fire Suppression Organization required at any stage of a fire is not necessarily dictated by the acreage of the fire but by the size and distribution of the suppression force and difficulty of its control.
4. As control is secured and the fire project moves into the "mop-up" stage demobilization of both labor and supervision, with appropriate organizational changes, must be initiated promptly.

FIRE ORGANIZATION BUILD-UP

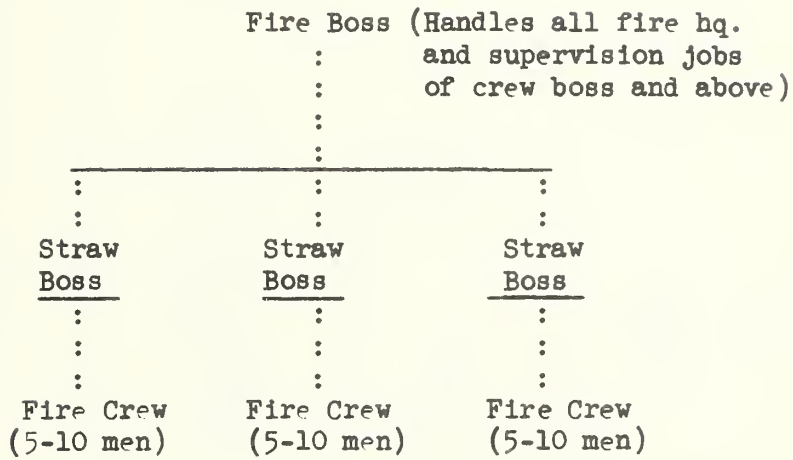
Chart I (5-15 men)

Fire Boss (Handles all fire and
: supervision jobs)
:
:
:
:
Fire Crew
(5-10 men)

FIG. #7

FIRE ORGANIZATION BUILD-UP

Chart II (20-35 men)



FIRE ORGANIZATION BUILD-UP

Chart III (50-75 men)

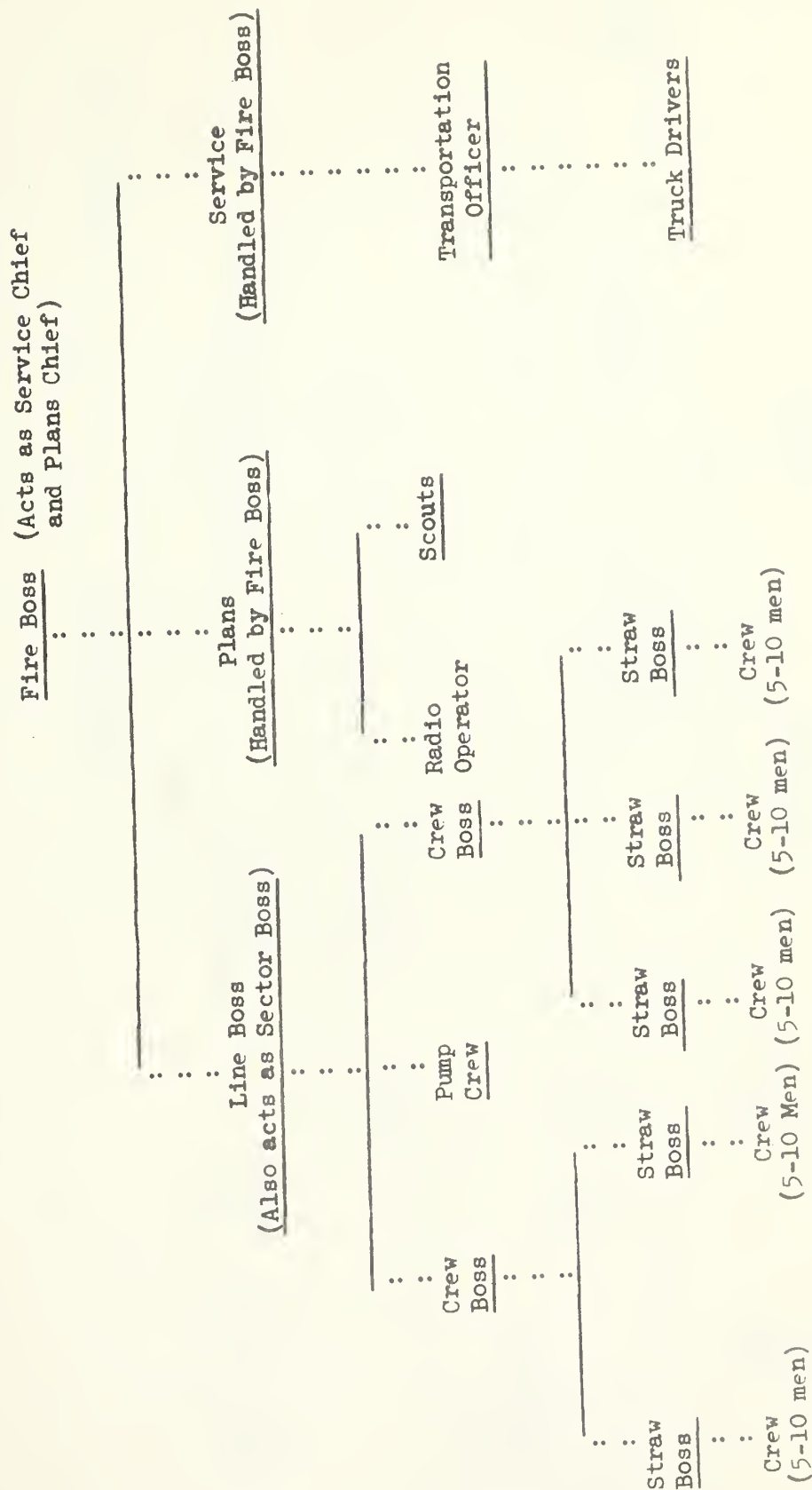


FIG. #9

FIRE ORGANIZATION BUILD-UP

Chart IV (100-200 men)

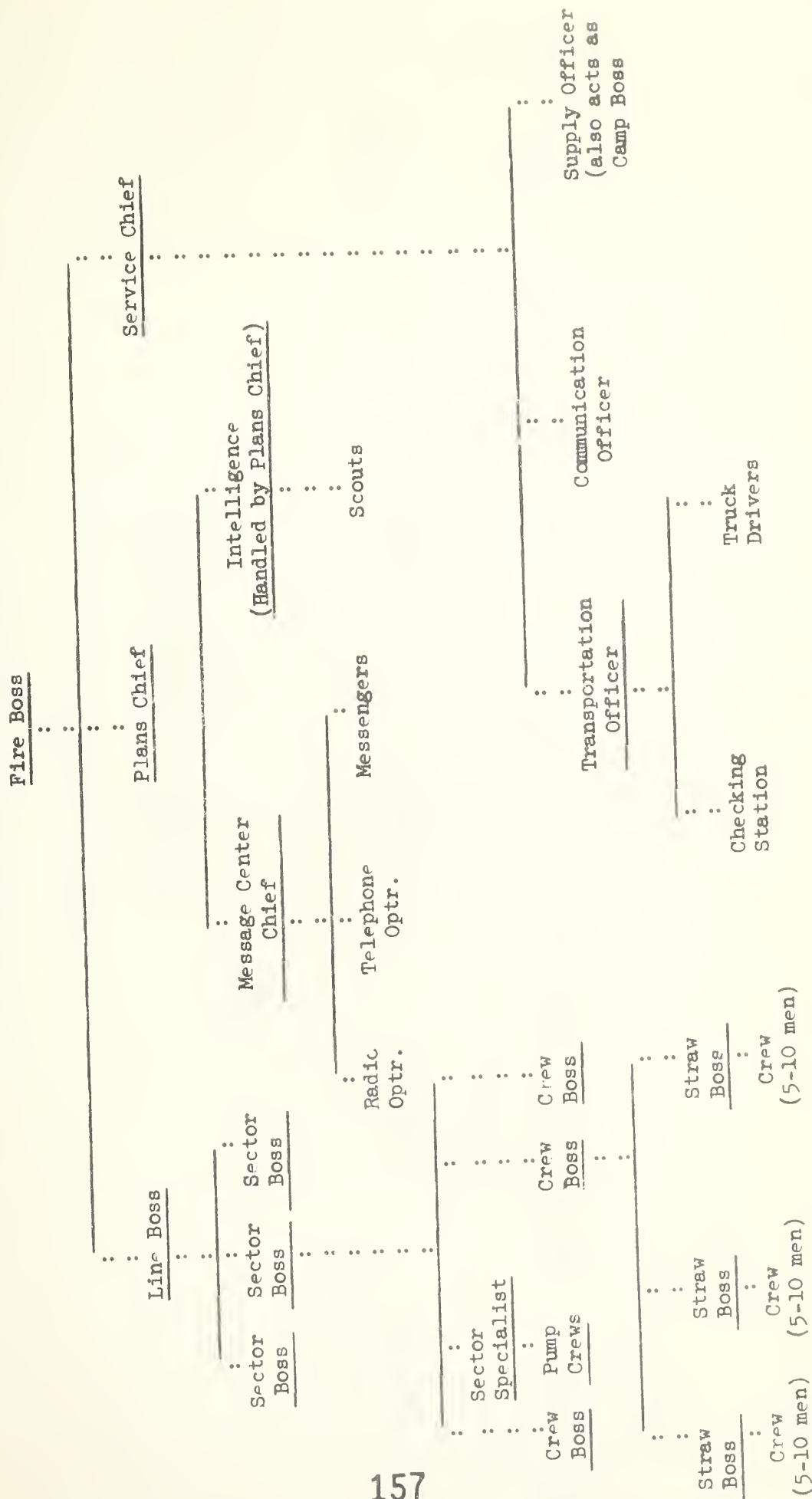


FIG. #10

S U M M A R Y

Operation of Fire Organization

The Fire Organization is a valuable aid in the conduct of a fire suppression operation. Its proper employment enables a Fire Boss to obtain vital operational information quickly, plan the operation efficiently and apply the suppression resources to the fire in the desired locations, at the proper time and in the proper amounts, all in accordance with the overall suppression plan. The continued use of this organization will facilitate fire planning, training, and the interchange of fire supervisory personnel between adjacent fire control agencies. If this organization is to contribute its maximum to fire control all supervisory fire control personnel at all levels must be made thoroughly familiar with its organization, operation and special techniques through frequent, well-planned and conducted training meetings and field problems. Inspection on actual fires in progress followed by critiques and Boards-of-Review will go far to indicate weaknesses in the operation which can be eliminated by better planning and greater training emphasis.

The Fire Organization

The basic principles of the Fire Organization, as presented in the foregoing pages, represent the principles of organizing for fire

control which have been developed to their present state through repeated use and trial throughout the country over the past 50 years. The Fire Organization is a tool, the use of which will permit the Fire Boss to control and apply to the fire a larger number of personnel and machines with a minimum of inefficiency and duplication of effort.

The basic underlying principle of the operation of the Fire Organization is "COORDINATION". Coordination of activity is the primary job of the Fire Boss and of each of his subordinate leaders.

While the Fire Organization is set up on a line-staff basis the Line Officer should not consider that planning is an exclusive function of the Planning Unit. Line Officers have a certain responsibility at their job levels. Field decisions and immediate plans must often be made and action taken to meet local conditions, such as sudden changes in wind, occurrences of spot fires, break-overs, etc. The Sector Boss and Crew Boss must plan how best to utilize their resources under these conditions. The fire behavior and subsequent action should be reported to the immediate superior without delay.

By the same token the Line Officer should not consider that the Service Unit will do all of the advance thinking for them. Line Officers must make their needs known. They must also assume certain Service responsibility that is a part of their job on the line, such as sharpening

tools on the line, distributing lunches, caring for injured, marking Sector boundaries and key points, etc.

On fires that involve large numbers of men and machines, with all the complications that ensue therefrom, it is good business to assign a man specifically qualified in fiscal and administrative procedures to the fire suppression project as an advisor to the Plans and Service Units. It becomes his responsibility to see that administrative service functions are being carried out within the administrative and legal framework of the organization or agency responsible for the protection of the area where the fire is located. The assignment of such an individual to the suppression project is insurance that is sure to relieve the Fire Boss and his Staff of many administrative and fiscal "headaches" at the close of the suppression project.

The Fire Organization, when fully expanded in all Units and Sections, appears on paper to include a somewhat awesome array of "non-fire-line" personnel. However, like any large organization, it is necessary to support the "on-the-line" fire-fighters and machines by adequate plans, supplies and services if the maximum efficiency is to be obtained from the "on-the-line" force. It is a part of the administrative job of the Fire Boss to constantly balance the need for this "overhead" as against the force committed to the direct suppression project and to modify the overhead force as needed to properly support

the direct suppression effort. Two of the most common errors in the administration of fire overhead, both on the line and in the Fire Headquarters, are:

1. Failure to anticipate a need of trained supervisory and technical personnel sufficiently in advance to assemble them and have them operating on the job by the time their services are required.
2. Failure to anticipate or recognize that certain elements are no longer required by the suppression project and to initiate demobilization of expensive overhead personnel and equipment as early as would be permitted by the situation.

In general, the operation and administration of the Fire Organization is dependent on the good judgment and experience of the Fire Boss and his Top Staff in the handling of fire suppression jobs of this magnitude.

A composite picture of the entire Fire Organization showing lines of responsibility and authority, and the general relation of the Units to each other and to the Fire Boss, is shown on the diagrammatic sketch of the Fire Organization on page 165, Fig. #12.

Plans Unit
(Plans Chief)

Records Section
(Records Officer)

Intelligence Section
(Intelligence Officer)

Record Fire Log
Clerk Clerk
Message
Center
(Message Center)
Chief

Scouts
Map & Record
Clerk
Weather
Clerk

Telephone
Operators
Radio
Operators
Messenger
Clerks

Cr

ORGANIZATION CHART - THE FIRE ORGANIZATION

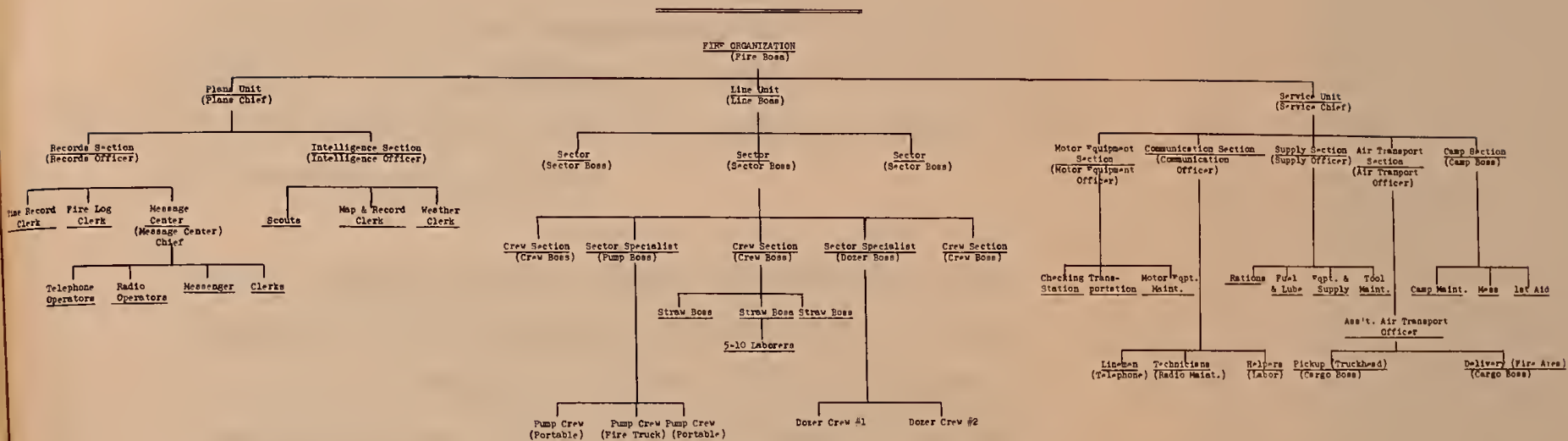


FIG. 12

THE FIRE DISPATCHING SYSTEM

In the preceding sections we have discussed the details of the suppression organization developed to handle any single fire, regardless of its size or character. Above the Fire Organization, and in direct support of it, is the "FIRE DISPATCHING SYSTEM" which is responsible for the initial assignment of personnel and resources to a fire, from which the Fire Organization is formed, and which supports the efforts of the Fire Organization throughout the suppression action by furnishing the manpower, supervision, equipment and supplies which are requested by the Fire Boss.

The Fire Dispatching System is composed of several levels, each coordinated with and supporting the work of the others. Figures #13 and #14, pages 169 and 171, illustrate the basic principles of a Dispatching System and show the relationship between the various levels and the individual Dispatching Headquarters. In reviewing these diagrams it will be noted that the dispatching levels are closely correlated and tied in with the normal administrative levels of the organization or agency responsible for forest fire control.

FIRE DISPATCHING ORGANIZATION

(State Service)

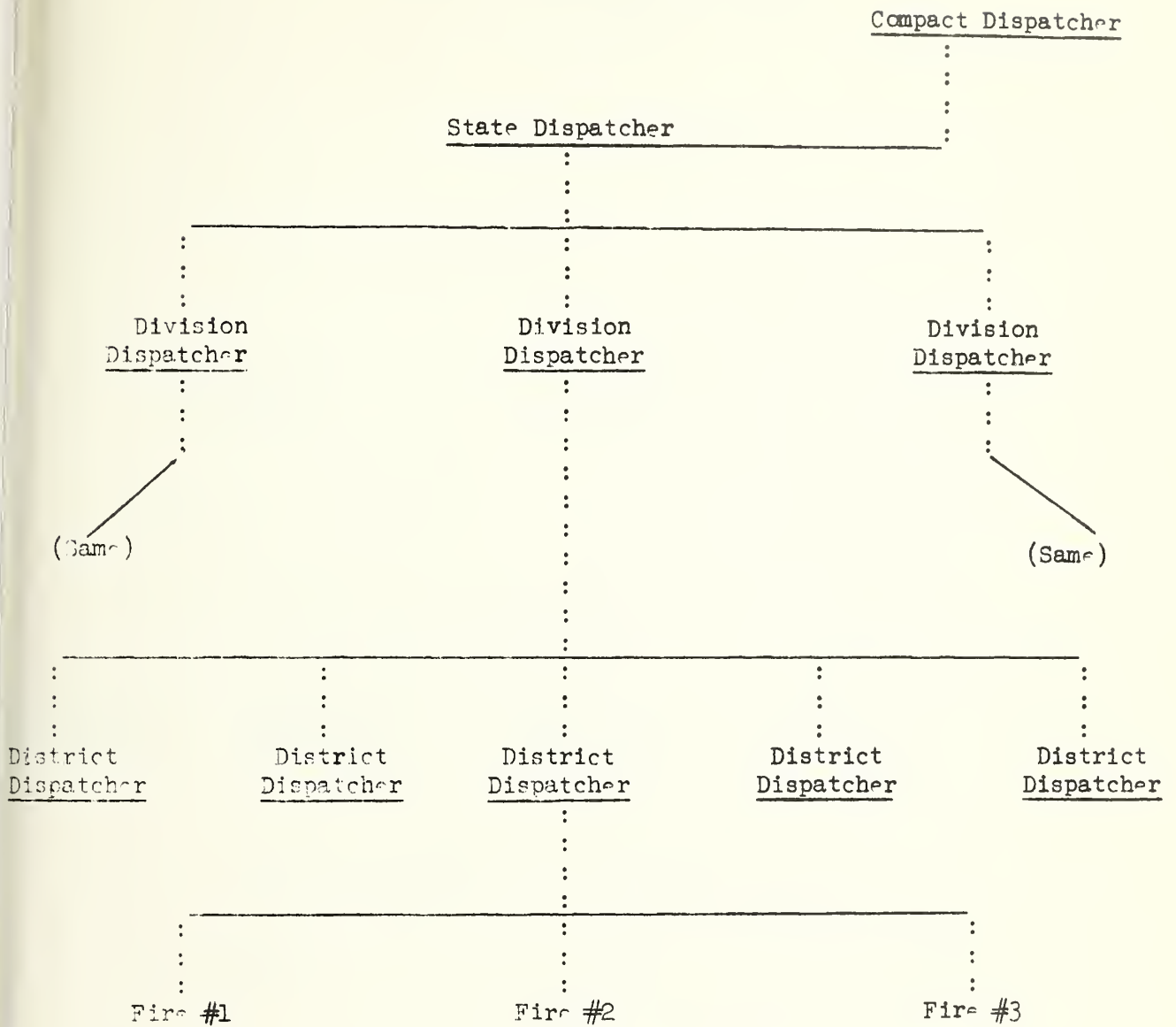


FIG. #13

FIRE DISPATCHING ORGANIZATION

(U.S.F.S.)

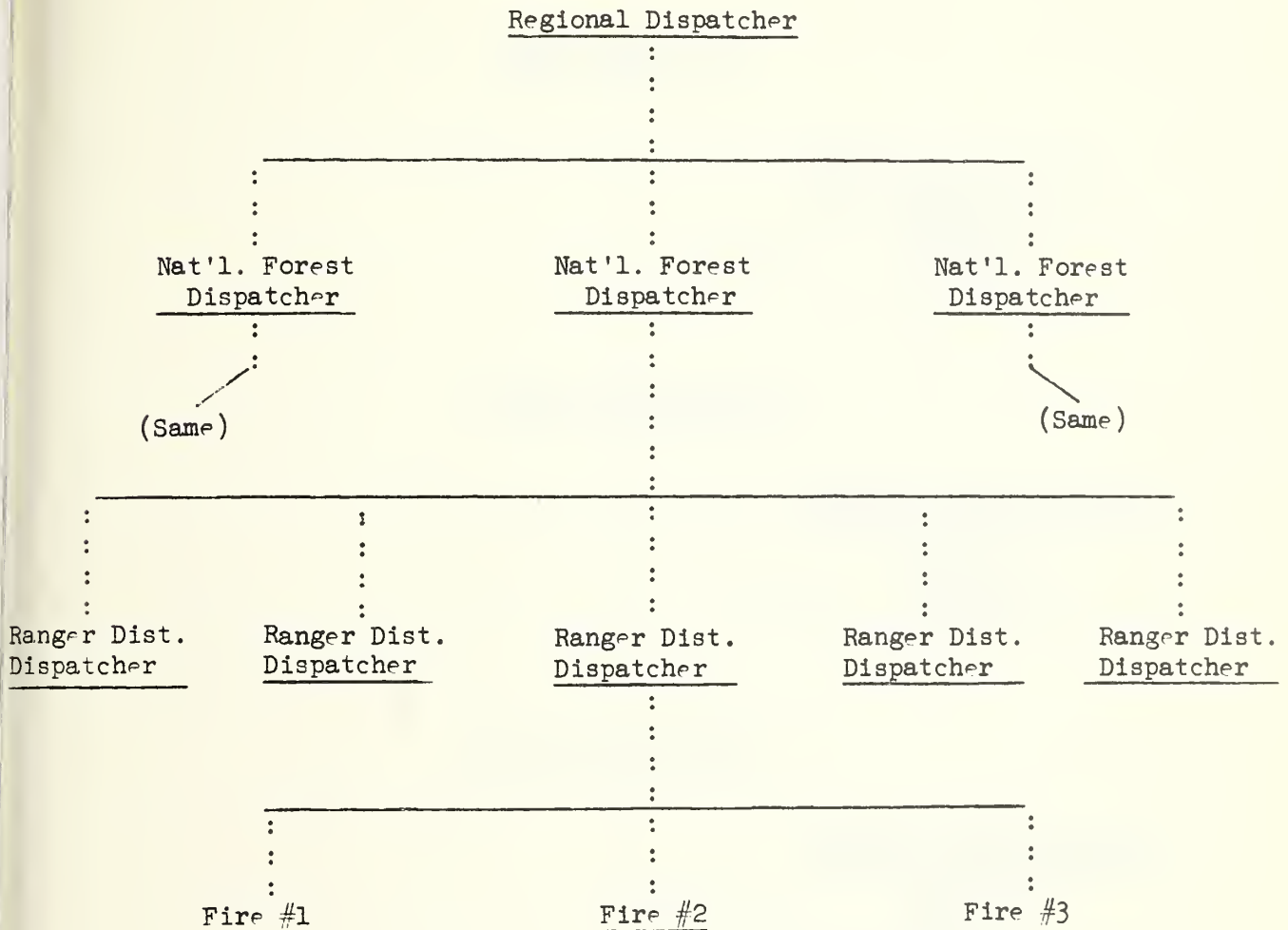


FIG. #14

CHAIN OF SUPPLY - FIRE DISPATCHING ORGANIZATION

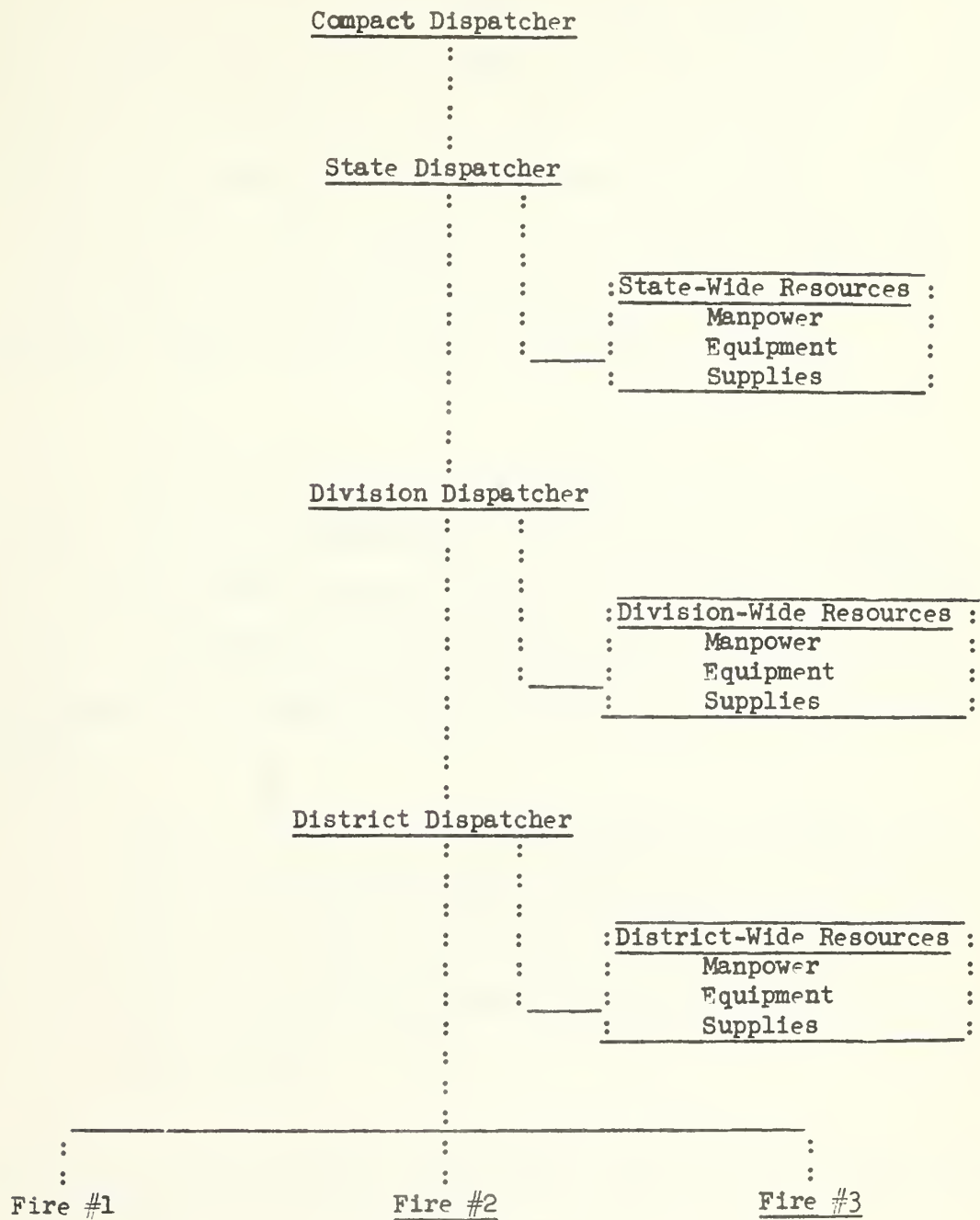


FIG. #15

The operation of the Fire Dispatching System is simple and direct.

The normal chain of request and supply is illustrated by the Diagram in Fig. #15, page 173. At each level the Fire Dispatcher has at his full disposal all of the fire suppression resources (manpower, equipment and supplies) of his level or zone of responsibility. He dispatches these resources to his subordinates in response to their requests, in each case weighing the need of that unit against the requirements of the other units under his jurisdiction and the available supply of these items at his immediate disposal.

As the suppression resource at any dispatching level threatens to become exhausted the Dispatcher immediately contacts the Dispatcher for the next higher level and requests that his supply of exhausted items be replenished. In meeting this request the higher level Dispatcher must consider the same factors for his zone of responsibility:

1. What are the needs of the requesting unit as compared with the needs of the other units in my zone of responsibility?
2. What is the supply of this item available to me now?
3. Can my supply be replenished and, if so, how soon and in what amounts?

The Dispatcher's decision, based on the consideration of these factors will determine his action on the request.

In any operation involving the operation of the Dispatching System the following basic principles must always be kept in mind:

1. The impetus of request is from below.
2. The impetus of supply must be from above.

To illustrate the normal operation of a Fire Dispatching System, such as is diagrammed in Fig. #15, page 173, let us consider as an example the chain of events resulting from the discovery from fire #3 (Fig. #15, page 173 .

Sequence of Events

1. Fires #1 and #2 are already in progress.
2. Fires #1 and #2 have nearly exhausted the District Dispatcher's resources of manpower, supervision and equipment. He has notified the Division Dispatcher of his small reserve and has been assured of support if required.
3. Fire #3 is reported. The District Dispatcher sends his remaining manpower and equipment for the initial attack on fire #3. He requests from the Division Dispatcher:
 - a. Additional manpower and equipment for assignment to the suppression of fire #3.
 - b. Additional manpower and equipment as a district standby for reserve for use in initial attack on other fires which may occur.

4. The Division Dispatcher, on receiving the above request, considers the situation in his zone of operation (the entire division), he evaluates it in terms of the three factors listed above, and takes the following action:
 - a. He dispatches the requested support, with the exception of one item (supervisory overhead) to the District Dispatcher.
 - b. He requests from the state Dispatcher:
 - (1) Supervisory overhead.
 - (2) Several other items which his last dispatch had exhausted from his Division reserve
5. A state Dispatcher, on receiving this request, considers the state-wide situation, and after evaluating it in terms of the basic factors, takes the following action.
 - a. Dispatches the required items to the Division Dispatcher from one of the divisions having less fire occurrence at that time.
 - b. Alerts all Divisions to keep him advised of their current situation and of the resources they can spare for dispatch outside of their own Division.
6. The Division Dispatcher, on receiving the personnel, equipment and supplies from the state Dispatcher takes the following action:

- a. Dispatches the supervisory overhead requested to the District Dispatcher.
 - b. Places the equipment and supplies in his own Division reserve to meet new fire requests.
7. The District Dispatcher, on receipt of the supervisory overhead from the Division Dispatcher, forwards them directly to the Fire Boss, fire #3.

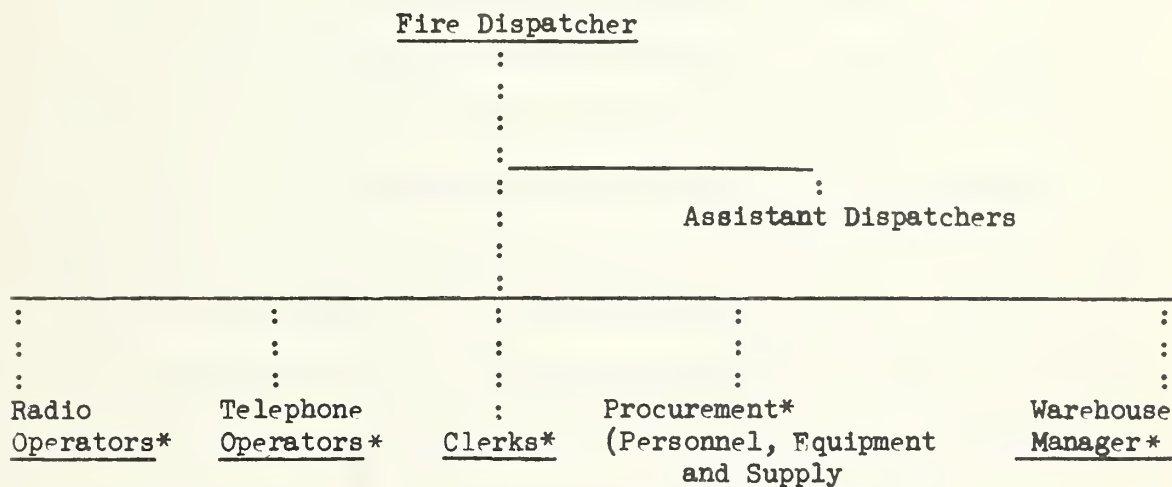
The Fire Dispatching System is the connecting link between the Fire Organization and the suppression resources of the agency responsible for forest fire control. The suppression action on a newly discovered fire is initiated by the lowest level of the Fire Dispatching System through the initial assignment of manpower, supervision, equipment and supplies. The Fire Dispatching System continues to maintain the suppression action of the Fire Organization by providing additional resources at the request of the Fire Boss.

THE FIRE DISPATCHER

At each dispatching level the Chief of Dispatching Operations for that level is designated as the Fire Dispatcher. He operates on the same basis as the Fire Boss in that he expands his dispatching organization according to the needs of the job. Initially he may handle the entire

dispatching job alone. As the dispatching demands build up he will probably add a relief or "Assistant" Dispatcher, one or more clerks, telephone and radio operators, a procurement officer, a warehouse manager and such other assistants as may be required to do the job. In the case of the complex fire situation a dispatching organization might be developed as shown in the following diagram:

Fire Dispatching Organization - Complex Fire Situation



*Shifts as required.

During the course of the build-up to a complex fire situation the levels of dispatching may shift upward as the situation develops. For example: The initial dispatch to a fire may be made by the lookout observer. As the fire increases and the lookout observer exhausts all of the resources at his command the lower dispatching level may shift to the District Headquarters. As the District

resources are exhausted dispatching may again shift to the Supervisor's Headquarters which would then dispatch direct to the fire or fires within its entire zone of influence. The operation of the dispatching system and the basis for such shifts must be spelled out plainly in the Dispatching Plan for the organization involved.

The responsibilities of the Dispatcher and the action taken by him will vary with the level with which he works as well as the fire situation. For example: A District Dispatcher working during the early stages of the fire must have a detailed knowledge of fire behavior and of proper suppression action. His tools are such things as fire danger charts, fuel type maps, topographic and basic maps, charts and tables of manpower and equipment locations and availability, all supplemented by his personal knowledge of fire suppressions operations, based on his own experience. When the fire is reported he notes its location and the factors which will influence its spread and those which will affect the suppression effort. On the basis of his analysis of these factors he must estimate the probable size and character of the fire at the time the first crew will be able to arrive. His initial dispatch will include sufficient men and equipment to handle a fire of this size and type.

With the arrival of the initial crew at the fire the character of the dispatching job changes from one of initial action to one of support.

Once the Fire Boss arrives on the fire it is he, and not the Dispatcher, who determines the need for additional personnel, equipment and supply. From that point on, throughout the course of the fire, the job of the Dispatcher is to support the suppression effort by insuring that the necessary resources of manpower, equipment and supplies are furnished to the Fire Boss on his request, insofar as available resources permit.

At the higher levels the character of the dispatching job is similar to that of the local dispatcher during the second or "support" phase. His principal job is the shifting of manpower, equipment and supplies within his zone of authority to meet the needs of local dispatchers. When his resources will no longer meet his needs he requests additional support from the higher dispatching level.

Prompt and efficient fire suppression action is dependent on rapid and accurate dispatching. The Dispatcher's job is to locate manpower, equipment and supplies and arrange for their prompt delivery on the fire. In order to accomplish this a considerable amount of advance work (pre-suppression) must have been invested in detailed planning which has resulted in producing such things as the dispatching maps and lists, showing location and availability of manpower, equipment and supplies, and the many other reference sources which go to make up the SUPPRESSION ACTION PLAN which is an important part of every Comprehensive Fire Plan.

The Fire Dispatcher is responsible directly to his immediate superior (District Ranger, District Forester, District Warden, etc.). For the prompt and efficient initiation of suppression action and the support of that action with all available suppression resources at his command, commensurate with the relative need of each project within the zone of dispatching authority.

The Fire Dispatcher discharges this responsibility by:

1. Thoroughly familiarizing himself with the Comprehensive Fire Plan, with special attention to the Suppression Action Plan for his zone of dispatching authority. This study must include not only the plan itself, but the general fuel types, topography, road net, high hazard areas, sources of manpower, equipment and supply and the interpretation of weather data in terms of fire danger. It also must include the insuring that these data are maintained on a current basis throughout the fire season.
2. Alerting the various units of the suppression organization in keeping with the fire danger and hazard build-up, as prescribed by the pre-suppression plan and the organization S.O.P.
3. Taking the following action on each fire reported:
 - a. Mark its location plainly and accurately on the Dispatcher's situation map.
 - b. Post the initial report in the Dispatcher's Fire Log.
 - c. Check the location of the fire as to:
 - (1) Fuel Type.

- (2) Topography.
 - (3) Accessibility.
 - (4) Values involved (timber, watershed, recreation, improvements, etc.).
- d. Checking current weather data as to:
- (1) Wind direction and velocity (at the fire location or as near it as possible).
 - (2) Daily burning index (most recent reading from station nearest fire).
 - (3) Cumulative fire danger index.
 - (4) Forecast for next 24 hours.
- e. Review lookout observers report as to:
- (1) Location (check initial plotting for accuracy).
 - (2) Estimated size.
 - (3) Smoke by:
 - (a) Type.
 - (b) Color.
 - (c) Volume.
 - (d) Direction and rate of drift.
- f. Check dispatching reference data (maps and lists) and determine:
- (1) Manpower and equipment within striking distance of the fire.
 - (2) Travel time of manpower and equipment required to reach the fire.

- g. Making a rapid estimate of the situation, considering all known factors, and determine the estimated;
- (1) Rate and direction of spread.
 - (2) Size of fire when first crews can arrive at the fire location.
 - (3) Manpower and equipment required for initial attack as prescribed by control policy, control plan and S.O.P.
 - (4) Additional reinforcements to the initial attack crew which will be required to attain control of the fire, and the time at which they can arrive at the fire.
 - (5) Location from which to make the initial attack and the best route of travel to that point.
- h. Dispatching initial attack crews and reinforcing crews in accordance with the estimate.
- i. Alert fire control personnel in accordance with S.O.P.
- j. Alert support for initial attack crews in accordance with estimate in the form of:
- (1) Supervision (Fire Team).
 - (2) Manpower
 - (3) Equipment
 - (4) Supplies
- k. Continue to maintain constant contact with the progress of the fire through lookout observers. Revise estimates in keeping with these observations.

- l. Maintain an accurate record of events, estimates and action taken in the Fire Dispatcher's Log.
- m. Revising the estimate of control resources on the basis of reports from the Fire Boss of the initial attack crew. Maintain this estimate on a current basis.
- n. Obtaining and dispatching of suppression resources as requested by the Fire Boss throughout the course of the suppression operation.
- o. Preparing, as soon after the close of the fire as time permits, a chronological summary of events pertaining to that fire and furnish copies to his immediate superior as a part of the basis for the fire report covering the entire suppression project.

S U M M A R Y

The Fire Dispatcher

The Fire Dispatcher, at the level immediately above the suppression project, is a key position to the suppression organization. On his individual initiative depends the promptness with which the initial attack crew is dispatched to a newly discovered fire. On his knowledge of the job and his good judgment as to the size and composition of the initial attack crew, supporting equipment, point of attack, and route to the fire depends the success or failure of the efforts of that

initial crew to hold or control that fire. Once the fire is in progress the Dispatcher must insure that his headquarters is alert and operating 24 hours per day. He must insure that his organization is developed and built up sufficiently in advance of the heavy dispatching demands to insure that it will be able to meet those demands as they arise. The Fire Dispatcher must insure that the requirements of the Fire Bosses, on the suppression projects for which he is responsible, are anticipated in advance and that the resources are assembled in readiness to fill these requests promptly. The Fire Dispatcher must insure that complete records are maintained at his level and that his immediate superior and higher dispatching levels are kept informed of the current situation. In cases where the dispatcher must produce the amount, number or type of resources below that requested by the Fire Boss, due to lack of proper items in stock, the good judgment of the dispatcher is the determining factor in insuring that the reductions are made in a manner which will least hamper the suppression project involved. In general, the effectiveness with which the fire organization is able to operate is determined to a considerable extent by the efficiency of the dispatching organization and of the dispatchers who man it.

NORTHEASTERN FOREST FIRE PROTECTION COMMISSION

THE TECHNIQUE OF INSTRUCTION

(Manuscript)

THE TECHNIQUE OF INSTRUCTION

Basis

One of the primary responsibilities of any supervisory position is that of training the personnel under supervision. The thoroughness and efficiency with which this training is accomplished is a determining factor in the efficiency of the operation of the organization and in the success of the individual as a supervisor.

In the development and maintenance of an efficient fire control organization, it is essential that the better trained and more experienced individuals be able to impart their knowledge and skills to the other members of the organization as a whole is to improve in knowledge, skill and efficiency. Such knowledge and skill can be imparted to those individuals most clearly and in a minimum of time if the basic principles of the techniques of instruction are observed and intelligently applied.

Principles of Learning

Learning may be defined as the process of acquiring new knowledge, skills, and appreciations which will enable the individual to do his job better. Note the emphasis on DOING. Learning for the sake of acquiring knowledge is hardly worthwhile unless that knowledge is useful in improving an individual's adjustment to his work, to the social group in which he lives or to his life in general. Learning is essentially an active process. We should stress "learn by doing".

A principle of learning is a generalization or truth that constitutes a guide for the selection and use of teaching methods, devices or techniques. Some of the principles of learning which illustrate the more fundamental conditions under which learning takes place most effectively are:

MOTIVATION

OBJECTIVE

DOING

REALISM

BACKGROUND

INCIDENTAL LEARNING

The principle of MOTIVATION is primarily the creation of a desire to want to learn the specific skill, technique or facts you are teaching. The trainee must want to learn. Among the means of MOTIVATION are:

- a. Show him how he personally can use the information you are about to teach.
- b. Develop intent to learn by developing trainee responsibility.

- c. Maintain trainee interest.
- d. Encourage early success.
- e. Give prompt recognition and credit.
- f. Avoid feelings and emotional responses which may inhibit learning.
- g. Use of competition.
- h. Use of reward and punishment.

The principle of the OBJECTIVE constitutes the establishment in the mind of the trainee of a definite goal or end he desires to attain. It may be the acquiring of certain knowledge or skill or the receiving of a passing grade in the subject but it is a definite marker or milestone in his educational progress.

The principle of DOING has as a basis the trainee learning by actually performing the operation under guidance. This principle is best illustrated by the sayings: "Experience is the best teacher" and "Practice makes perfect".

The principle of REALISM utilizes the practical application of the technique or skill to be presented. Instruction should approach actual field conditions and application as near as possible.

The principle of BACKGROUND utilizes the knowledge, skill and experience already possessed by the trainee as a base on which to build additional learning.

The principle of INCIDENTAL LEARNING well describes the acquiring of habits, traits and appreciations as a by-product of instruction in skills and techniques. The products acquired by this means are frequently as important to the general success of the trainee in accomplishing his job as are the specific skills and knowledge acquired. The attitude and example of the instructor will play an important part in determining the amount and kind of incidental learning of the trainee.

IF THE TRAINEE FAILS TO LEARN THE INSTRUCTOR HAS FAILED TO TEACH.

Learning results from stimulation through the senses. IF instruction is registered, assimilated and retained.

The requirements for effective learning are:

MOTIVATION

UNDERSTANDING

PRACTICE

The Instructor

Among the primary qualifications required to accomplish an effective job of instruction are:

- a. Knowledge of the subject.
- b. Knowledge of the proper methods of instructions.
- c. Personality.
- d. Leadership.
- e. Professional attitude.

Seldom will a prospective instructor possess all of these qualifications at the beginning of his teaching experience. He must, through training and a constant personal effort, improve his instruction technique by developing those qualifications which he lacks and by strengthening those which he already possesses to some measure.

Instruction technique may be improved by the application and practice of such principles as:

- a. Know what makes good instruction.
- b. Observe other instructors.
- c. Analyze your own characteristics.
- d. Concentrate on the improvement of specific elements.
- e. Seek the help of associates.
- f. Maintain a constant effort to improve.

Instruction

Experience indicates that instruction may be presented most effectively when it is planned and executed in accordance with an orderly process or sequence consisting of the following major activities or "stages of instruction".

PREPARATION

PRESENTATION

APPLICATION

EXAMINATION

DISCUSSION AND CRITIQUE

A. PREPARATION

Careful planning is always the first step in efficient training. Such planning usually includes the following steps:

1. Consideration of the specific factors which will influence the effectiveness of the instructional situation.
2. Analysis of the subject to determine its objectives and to insure that the essential facts presented will contribute to the primary training objective.
3. Preparation of a lesson plan aimed at achieving specific intermediate objectives and contributing to the primary training objective.

In the majority of cases, trainee's failure to learn can be traced directly to inadequate planning by the instructor.

GOOD INSTRUCTION MUST HAVE A PLAN

B. PRESENTATION

Actual teaching begins with the second stage of instruction, the presentation stage.

A good presentation consists of three principal parts or phases, which are:

INTRODUCTION

EXPLANATION

DEMONSTRATION

1. Introduction

This is the portion of the presentation which prepares the trainee to assimilate the ideas which are to be presented to him. By attracting his attention and arousing his enthusiasm with an interesting and informative introduction, we have created in him a receptive attitude toward the instruction to be presented. In the introduction the trainee is told WHAT he is to learn, WHY learning it will be of advantage to him and the PROFICIENCY he is expected to attain.

2. Explanation

The explanation presents facts and information to the trainee in the form of lectures, talks by persons experienced in the particular subject or discussions by the group supplemented by films, slides, charts, models and other appropriate training aids, utilizing several of the senses, such as sight, touch and smell, as well as hearing.

3. Demonstration

This is an additional method of presenting new material to the trainee - by SHOWING - and is one of the most effective. Most trainees remember the things they can see easier and longer than information they hear. The instructor who fails to take advantage of that fact is overlooking one of his most useful tools. Wherever possible, every instructional presentation should include a demonstration.

By first preparing the trainee for the instruction (introduction) presenting the details of the subject matter (explanation), and actually performing the operation for his observation (demonstration), he is given ample opportunity to become familiar with the subject in a natural and logical sequence.

C. APPLICATION

In this stage of instruction, the trainee is given the opportunity of DOING. Experience indicates that the average trainee learns most thoroughly by doing. Here he puts into practice the principles and instructions which were explained and demonstrated to him previously.

D. EXAMINATION

The trainee has had an opportunity to hear about the subject, to see it demonstrated, and to do the operation himself. The instructor now checks to

measure the extent to which the trainee has mastered the essential elements of the subject matter presented. This is done by an examination. The instructor is faced with the problem of what to measure and how to measure it. A number of different testing techniques should be used in evaluating student progress.

F. DISCUSSION AND CRITIQUE

This is the final stage of instruction and should always follow the examination or, if no examination is planned, should follow the application stage. Here the instructor REVIEWS the knowledge, skills and techniques which have been presented, clears up any questions which the trainee may have and generally sums up the entire presentation of the subject. The function of this final stage is to give a complete picture of the subject which has been taught and to clarify any phases of the instruction which are not fully understood.

The subject of INSTRUCTION May well be summarized by the use of the following key words:

PLAN
TELL
SHOW
DO
CHECK
REVIEW

which outline, in proper sequence, the normal steps in presenting instruction on any subject. These six key words may be correlated with the five major stages of instruction as follows:

<u>PREPARATION</u>	-	<u>PLAN</u>
	(	<u>TELL</u>
<u>PRESENTATION</u>	-	(
	(	<u>SHOW</u>
<u>APPLICATION</u>	-	<u>DO</u>
<u>EXAMINATION</u>	-	<u>CHECK</u>
<u>DISCUSSION AND CRITIQUE</u>	-	<u>REVIEW</u>

PLANNING THE LESSON

One of the most important factors in successful instruction is careful and thorough preparation by the instructor.

An orderly procedure commonly followed in planning may be outlined as follows:

- a. Make an estimate of the instructional situation.
- b. Select and organize your subject matter.
- c. Make a lesson plan.
- d. Rehearse.
- e. Make a final check of all items.

Estimate of the Training Situation

In making the estimate of the training situation certain factors must be considered. They can best be remembered by using the key word "ESTIMATE" in the following manner:

E quipment, facilities and training aids.
 S tate of knowledge and training of the group.
 T ime available.
 I nstructors needed.
 M ission.
 A nalysis of the subject.
 T raining conditions
 E very problem anticipated.

Selection and Organization of Subject Matter

The selection and organization of the subject matter will be heavily influenced by the results of the "estimate". Knowing the objective of the instruction to be given, subject matter is selected which will best bring out the intermediate points or lessons and still contribute to the overall training objective. This subject matter is then arranged and presented in a logical and interesting manner, using methods best suited to the background of the group and applied in accordance with the approved principles of instruction. In planning, every effort must be made to include the use of training aids, demonstrations and as much actual "doing" by the trainee as the time and subject will permit.

The Lesson Plan

The lessonplan is the teaching guide for the instructor. No instruction of any length should be attempted without a written lesson plan. To do so is sure to invite a poorly organized and incomplete presentation which will result in embarrassment for the instructor, a minimum of learning by the trainees and a waste of time and money for the organization.

Advantages

The advantages of a well prepared lesson plan are many. Among the more important benefits are:

- a. Coverage: Insures that subject matter is completely covered and keeps the instructor pointed toward his goal.
- b. Sequence: Insures that material is well organized and that main points are presented in logical sequence.
- c. Timing: Insures that the entire subject is covered in the time available.
- d. Method: Insures that the planned methods are used and that proper use is made of the planned visual aids.

- e. Preparation Insurance: A complete lesson plan gives confidence to the instructor as he knows that he is fully prepared.
- f. Record: Insures that all questions are covered in class and provides a record for reference in preparing examinations.
- g. Guide: Provides a detailed teaching guide, refreshes the memory of the instructor and adds to his self-confidence.

Purpose

The purpose of a lesson plan is to insure, in the preparation stage, that the lesson will be well taught. It shows:

- a. Material to be presented.
- b. Sequence of presentation.
- c. Procedures to be used.
- d. Training aids to be utilized.

Lesson Plan Outline

In preparing lesson plans covering a number of subjects, or several points pertaining to the same subject, it is most desirable that a uniform or "standard" outline form be used. This is particularly helpful if the same lesson plan is to be used by other instructors at a later date.

The following form of lesson plan outline has been found well suited to fire control instruction:

1. PRESENTATION (state method and time required)
 - a. Introduction (time required)

NOTE: (If some special technique, story, etc., is to be used, put it in the lesson plan as a NOTE.)

 - (1) Objective: (Give the objective or purpose of the instruction.)
 - (2) Standards: (If specific standards are required in the lesson, tell the trainee what is expected of him.)
 - (3) Reasons: (Give the trainee reasons why he should want to learn this lesson. Stress its importance.)
 - (4) Other elements to be outlined in the introduction, such as:
 - (a) Review of previous instruction.
 - (b) Procedure to be followed in teaching this subject.

NOTE: (These elements in the introduction may be outlined in any order which seems best for presentation.)
 - b. Explanation and Demonstration (time required)
 - (1) Explanation

(a) (FIRST MAIN POINT)

(1') (Fact, opinion or evidence supporting this point.)

(a') (Important item relating to (1')).

(b') (Another item supporting (1')).

(1'') Subordinate data in support of (b')

(2'') More data in support of (b')

(a'') Item to support (2'').

(b'') Another item to support (2'')
etc.

(3') Another point supporting (b').

(2') (Another fact supporting (a)).

(b) (SECOND MAIN POINT)

(1') (Fact supporting (b)).

(a') Item supporting (1')

(b') Another item supporting (1') etc.

(2') Another fact supporting (b) etc.

SUMMARIZE: (Summary of all main points covered)

(2) Demonstration

(a) Outline in proper order the steps of the procedure to be followed.

(b) List in order, by NOTE or QUESTION, Notes on equipment used and frequent questions to check trainee understanding, etc.)

(c) Summary of Demonstration to include review of main points demonstrated, re-emphasize important items, and indicate how demonstration illustrates relation of subject to overall training objective.

2. APPLICATION

(state method and time required)

a. Outline in detail:

(1) Directions to trainees.

(2) Arrangement of trainees, requirements and materials.

(3) General plan for conduct of practical work.

(4) Practical exercises, if any, in an annex to the plan.

b. Outline instructor's activities.

(1) Supervision.

(2) Procedures to be followed.

(3) Safety precautions to be observed.

3. EXAMINATION

(State method and time required)

- a. Written Test (Include complete test and directions as an annex)
- b. Oral Test (Include questions to be asked)
- c. Observation of trainee work. (List specific points to check and indicate how trainees are to be rated or scored.)
- d. Practical Exercise Problem (Complete problem included as an annex).

4. DISCUSSION AND CRITIQUE

(State method and time required)

- a. Clarify all points with which trainee has had difficulty.
- b. Ask for questions from the trainee.
- c. Summarize the lesson.

- (1) Recap all main points covered.
- (2) Outline these main points with relation to overall instruction.

- d. Close with a strong statement. (Write out fully)

NOTE: A lesson which does not contain the APPLICATION or EXAMINATION stages will list and number only those stages employed and omit the others. In the case of a lecture (which employs only the PRESENTATION stage) the main divisions of the lesson plan will be

1. INTRODUCTION

2. EXPLANATION

3. SUMMARY

There are two general types of lesson plans:

The Topic Outline Type

The Sentence Outline Type

In using the topic outline type the instructor's manuscript is usually required to supplement the lesson plan in teaching. An example of the topic outline is:

EXAMPLE: (1) Fundamental logistical considerations.

- (a) Supply - a function of command.
- (b) Impetus of supply is from the rear.
- (c) Need for advanced flexible planning.
- (d) Adequate reserve at all levels.

(2) Other logistical considerations.

The sentence outline type of lesson plan usually combines the lesson plan with the manuscript. Here the instructor must make additional notes for his use in presenting the lesson.

Presenting Oral Instruction

Oral instruction is normally presented in three parts: The INTRODUCTION, the BODY, and the SUMMARY. The instructor's task is greatly simplified and his instruction is more effective when he understands how each of these elements is employed.

THE INTRODUCTION

By means of the introduction the instructor sets the stage for his presentation. A good introduction accomplishes this by:

- a. Establishing a friendly contact between instructor and his class.
- b. Arousing interest in the subject and securing attention.
- c. Disclosing the nature of the subject.
- d. Clarifying the objective of the lesson.

The introduction should be clear to the trainee, must be convincing, and should motivate him for the instruction.

The methods employed to secure these objectives are many, among which the following have proved to be the most successful:

- a. A good opening statement.
- b. Stories and examples.
- c. Startling facts.
- d. Quotations.
- e. Rhetorical questions.
- f. Skits or demonstrations.
- g. Tell What, Why and How.

The introduction is composed of a series of elements which, when applied in a logical sequence, establish a foundation in the mind of the trainee on which to build the knowledge he is to acquire.

Objective

The primary element of the introduction is the OBJECTIVE of that particular lesson. The instructor should state briefly and clearly what is to be learned by the trainee. The objective should always be stated in terms of the trainees learning rather than in terms of the instructor teaching. This places the responsibility for learning squarely on the trainee. The objective should be stated forcefully and enthusiastically. Be brief, clear, decisive and specific.

Reasons

The second element of an introduction is a clear-cut statement of the REASONS the trainee should want to learn the skills, methods or knowledge to be presented. The use of an example or story to illustrate the value of such knowledge to the trainee will contribute much toward creating a desire in his mind for such knowledge. In fire control training, always stress the importance of the lesson in fire suppression work

Standards

Another important element of a good introduction is a brief statement of the standards the trainee is expected to attain. Let the trainee know what is expected of him.

Procedure

If a special procedure is to be followed in conducting the lesson, it should be outlined briefly to insure that the trainee knows what to expect.

Review

When the lesson to be taught is closely tied in with a previous lesson or another subject, a brief review and summary of that subject provides a connecting link to a known subject on which to base the new lesson.

These elements follow no set order in the introduction but should be arranged in a sequence which will most effectively lay the foundation for the instruction which follows. In planning the introduction a special check should be made to insure that it includes the objective, reasons and the specific standards. In brief, always let the trainee know WHAT he is to learn, WHY it is important to him that he learn it, and WHAT IS EXPECTED OF HIM..

THE BODY

The BODY of the presentation contains the meat of the instruction. Here we have the complete explanation and demonstration of the facts, skills and knowledge we are seeking to teach. In brief, the purpose of the body is to:

- a. Present principal teaching points.
- b. Explain knowledge.
- c. Develop understanding.
- d. Stimulate appreciations.

Accomplishment may be achieved through the use of:

- a. Sound organization.
- b. Smooth transitions.
- c. Repetition of basic principles.
- d. Frequent summaries.
- e. A vital and interesting presentation.
- f. Emphasis of principal ideas.

ORGANIZATION

Oral instruction frequently fails to produce the desired learning because the trainee "can't follow" the organization of the presentation. "Main Points" should be emphasized so that their importance and relation to the other information is readily apparent to the trainee. One aid in this problem is the limiting of the number of main points. Two or three can be easily remembered and four or five mastered with a little more difficulty. Beyond that the average trainee will become hopelessly confused. In the planning of a lesson it is wise to follow a practice of limiting the number of main points to a maximum of five. If the trainee cannot follow you he will be unable to arrive at your objective.

TRANSITION

One of the problems of oral instruction is the transfer of the thought of the group from point to point. If the trainee is to follow you this must be accomplished smoothly and without noticeable effort on his part. Steps must be progressive and in a natural sequence. When smoothly presented, the main ideas are connected by transitional words, sentences and statements. Transitions are to the main ideas as approaches are to a bridge; they enable the trainee to follow the instructor easily. Some of the more common means of securing good transitions are to:

- a. Refer frequently to the objective of the lesson.
- b. Use frequent summaries.
- c. Use rhetorical questions.
- d. Use connective phrases.
- e. Enumerate points as they are presented (first, second, etc.)

REPETITION

Repetition of the more important points and facts throughout the presentation serves to:

- a. Fix them more firmly in the trainee's mind.
- b. Show how they support and supplement other parts of the presentation.
- c. Impress the trainee with their importance.

SUMMARIES

Frequent summaries are an aid to both trainee and instructor as they permit both to pause and "take stock" at natural breaks or transition points in the presentation. Summaries often serve as a springboard on which to base transitional sentences which lead to the next main point.

INTEREST

If the student is to learn his interest in the subject must be maintained at a high level throughout the instruction. Some of the techniques which serve to maintain interest are the use of:

- a. Specific explanations.
- b. Stories and experiences.
- c. Illustrations and examples.
- d. Rhetorical questions.
- e. Training aids.

EMPHASIS

Throughout the presentation special emphasis must be placed on the principal ideas advanced to insure that they stand out in the mind of the trainee. Among the means used successfully in securing emphasis of specific ideas or principles presented are:

- a. Repetition.
- b. Visual aids.
- c. Examples and illustrations.

THE SUMMARY

The purpose of the SUMMARY is to:

- a. Provide an overall view of the subject presented.
- b. To emphasize the main ideas advanced.
- c. To sum up and clarify the instruction.

The instructor must keep in mind that a summary must be brief. Do not try to reteach the lesson.

The summary of an oral presentation consists of three definite parts:

- a. Clear up all questions on which the trainee is not clear.
- b. Recap the main points covered in the lesson with special emphasis on the important ideas, steps in procedure and safety precautions presented.
- c. Present a strong closing statement.

Intermediate summaries should be used at the end of each important phase of the oral instruction and will consist of items a and b above. At the end of the lesson the regular lesson summary is presented, consisting of all three elements.

In many cases, a good summary is the strongest part of the lesson and makes the difference between a good presentation and a poor one. The instructor must not overlook the summary. It is one of his most useful and impressing tools.

NORTHEASTERN FOREST FIRE PROTECTION COMMISSION

LESSON PLAN

SUBJECT:	: The Technique of Instruction
METHOD:	: Lecture
TIME ALLOTTED:	: Two Hours
EQUIPMENT & SUPPLIES:	: Check List - Instruction Techniques
INSTRUCTOR ASSISTANCE:	: Assistant Instructors - Two
TRAINING AIDS:	: Blackboard, Charts and Visual Cast Projector
REFERENCES:	: Technique of Military Instruction, the Armored School
STUDY ASSIGNMENT:	: None
TRAINEE EQUIPMENT REQUIRED:	: Notebook and Pencil
OTHER INFORMATION:	:
	:
	:
	:
	:
	:
	:
	:

1. PRESENTATION

a. Introduction

- (1) Objective: To learn some of the basic methods and techniques of preparing and presenting instruction.
- (2) Reasons:
- (a) Instruction is a responsibility of supervision.
 - (b) Knowledge of instruction methods increases the efficiency of the instruction and enables the instructor to accomplish his job with a minimum of effort.

EXAMPLE: All fire personnel must present instruction to fire crews, town wardens, etc.

b. Explanation

(1) Principles of Learning

Learning is the process of acquiring new knowledge, skills and appreciations which will enable the individual to do his job better.

NOTE: Emphasis on DOING

Learning is an active process
We learn by DOING

Basic principles of learning:

(a) MOTIVATION

The creation of a desire to learn the specific skill or knowledge to be taught.

The trainee must want to learn

Means of Motivation:

- (1) Show trainee how the information will be useful to him.
- (2) Develop trainee responsibility.
- (3) Maintain interest.
- (4) Encourage early success.
- (5) Give prompt recognition and credit.
- (6) Avoid feelings and emotional responses.
- (7) Use competition.
- (8) Use reward and punishment

(b) OBJECTIVE

Establishment of goal for trainee to attain.

(c) DOING

- (1) Learn by doing.
- (2) Experience is the best teacher.
- (3) Practice makes perfect.

(d) REALISM

Practical application approaching field conditions.

(e) BACKGROUND

Utilizing what the trainee already knows as a base on which to build additional knowledge.

(f) INCIDENTAL LEARNING

The acquiring of habits, traits and appreciations as a by-product of instruction in skills and techniques.

EXAMPLE: Group may learn better organization of their daily work from study of the large fire organization.

Learning results from stimulation through senses IF instruction is:

Registered

Assimilated

Retained

Requirements for effective learning:

MOTIVATION

UNDERSTANDING

PRACTICE

IF THE TRAINEE FAILS TO LEARN THE INSTRUCTOR HAS FAILED TO TEACH

(2) The Instructor

(a) Primary qualifications:

- (1') Knowledge of the subject.
- (2') Knowledge of the proper methods of instruction.
- (3') Personality.
- (4') Leadership.
- (5') Professional attitude.

(b) Improve instructional ability

- (1') Training
- (2') Constant personal effort.

(c) Principles for improvement of instructional ability:

- (1') Know what makes good instruction.
- (2') Observe other instructors.
- (3') Analyze your own characteristics.
- (4') Concentrate on the improvement of specific elements.
- (5') Seek the help of associates.
- (6') Maintain a constant effort to improve.

(3) Instruction

The job of instruction is usually handled in five major stages:

PREPARATION

PRESENTATION

APPLICATION

EXAMINATION

DISCUSSION AND CRITIQUE

(a) PREPARATION

(1') Careful planning is always the initial step in good training.

- (a') Estimate of instructional situation.
- (b') Select and organize subject matter.
- (c') Make a lesson plan.
- (d') Rehearse.
- (e') Make a final check of all elements.

(2') GOOD INSTRUCTION MUST HAVE A PLAN

(3') In the majority of cases trainee's failure to learn can be traced directly to inadequate planning by the instructor.

(b) PRESENTATION

Actual teaching begins here. Phases of presentation are:

INTRODUCTION

EXPLANATION

DEMONSTRATION

(1') INTRODUCTION

(a') Prepares trainee to receive ideas to be presented.

(b') Introduction tells trainee:

(1") WHAT he is to learn.

(2") WHY learning it will be of advantage to him

(3") PROFICIENCY he is expected to attain.

(2') EXPLANATION

Presents facts, methods and data.

(3') DEMONSTRATION

(a') Show skills, methods, etc., explained above.

(b') Trainees remember what they see longer than what they hear.

(c) APPLICATION

Apply the principle of DOING.

(d) EXAMINATION

This is the check on trainee learning.

(e) DISCUSSION AND CRITIQUE

(1') Answers remaining questions.

(2') Reviews information presented.

NOTE:

Presentation may be summarized quickly by:

PLAN

TELL

SHOW

DO

CHECK

REVIEW

(4) Planning the Lesson

(a) Successful instruction requires thorough preparation by the instructor.

(b) Steps in lesson planning:

- (1') Estimate the instructional situation.
- (2') Select and organize the subject matter.
- (3') Make a lesson plan.
- (4') Rehearse.
- (5') Final check of all items

(c) Estimate of the training situation.

Key word E-S-T-I-M-A-T-E

E quipment, facilities and training aids.
S tate of knowledge and training of trainee.
T ime available.
I nstructors needed.
M ission.
A nalysis of the subject.
T raining conditions.
E very problem anticipated.

(d) Select and organize the subject matter based on the "estimate". Insure that it contributes to the overall training objective.

(e) The Lesson Plan.

No instruction should be attempted without a written lesson plan. To do so will result in:

Poorly organized and incomplete presentation.
Embarrassment for the instructor.
A minimum of learning by trainees.
Waste of time and money by the organization.

(1') Advantages of a lesson plan:

- (a') Coverage of subject.
- (b') Logical sequence of ideas.
- (c') Timing to insure subject coverage in time allotted.
- (d') Planned method used.
- (e') Insures preparation.
- (f') Provides a record of instruction.
- (g') Is a teaching guide for the instructor.

(2') Purpose

To insure, in the planning stage, that the lesson will be well taught.

It shows:

- (a') Material to be presented.
- (b') Sequence of presentation.
- (c') Procedures to be used.
- (d') Training aids to be utilized.

(3') Lesson Plan Outline

NOTE: See Narrative, Pages 7-9.

(5) Oral Instruction

Presented in three parts:

Introduction

Body

Summary

(a) Introduction

Establishes a friendly contact between instructor and class.
Arouses interest in the subject and secures attention.
Discloses the nature of the subject.
Clarifies the objective of the lesson.

- (1') The introduction must be clear, convincing and motivating.
- (2') Techniques employed to this end are:

- (a') A good opening statement.
- (b') Startling facts.
- (c') Quotations.
- (d') Rhetorical Questions.
- (e') Skits and demonstrations.
- (f') Tell What, Why and How.

(3) Introduction composed of several elements:

(a') Objective

Objective of that particular lesson.
Must be brief, clear, decisive and specific.
Stated forcefully and enthusiastically.
Stated in terms of trainee learning NOT
instructor teaching.

(b') Reasons

State reason trainee should want to learn
subject.

Show how subject will benefit him.
Stress subject importance in fire control.

(c') Standards

Let trainee know what is expected of him.

(d') Procedure

Outline any special procedure to be followed in conducting the lesson.

EXAMPLE: "After a 10 minute lecture period the class will assemble by 5-man groups to solve a series of short problems."

(e') Review of previous lessons which form a background for subject to be presented.

SUMMARY: The introductions must always contain as a minimum, the objective and reasons.

Let trainee know WHAT he is to learn and WHY he should learn it.

(b) Body

(1') Contains the meat of the instruction.

(2') Purpose

(a') Present teaching points.

(b') Explain knowledge.

(c') Develop understanding.

(d') Stimulate appreciations.

(3') Accomplishment achieved by:

(a') Sound organization. (Logical sequence, limit main points.)

(b') Smooth transitions. (Transfer of group thought point to point.)

(c') Repetition of basic principles. (Fix in trainee's mind.)

(d') Frequent summaries. (Take stock and point up.)

(e') Emphasis of principal ideas. (Impress trainees.)

(f') A vital and interesting presentation.
(Maintain trainee interest.)

(c) Summary

(1') Purpose:

- (a') Provide overall picture of subject.
 - (b') Emphasize main ideas.
 - (c') Sum-up and clarify the instruction.
- (2') Must be brief - Do not try to reteach the lesson.
- (3') Summary consists of three main parts:
- (a') Clear up questions.
 - (b') Recap main points.
 - (c') Strong closing statement.

Summary is instructor's most useful tool.

(6) Closing Statement

A thorough working knowledge of the TECHNIQUE OF INSTRUCTION is a basic requirement for successful and efficient supervision. The intelligent application of such knowledge can mean the difference between success and failure of the supervisory effort.

NORTHEASTERN FOREST FIRE PROTECTION COMMISSION

CHECK LIST

for

INSTRUCTION TECHNIQUES

STAGES OF INSTRUCTION

Stage	Activities and Methods
PREPARATION	<ol style="list-style-type: none">1. Estimate the training situation.2. Select and organize subject matter.3. Make lesson plan.4. Rehearse the lesson.5. Make final check
PRESENTATION	<ol style="list-style-type: none">1. Lecture2. Conference3. Demonstration
APPLICATION	<ol style="list-style-type: none">1. Individual Performance.<ol style="list-style-type: none">a. Supervised individual performance.b. Group performance.c. Coach and pupil method2. Team performance
EXAMINATION	<ol style="list-style-type: none">1. Oral tests2. Written tests.3. Performance tests.4. Observation
DISCUSSION OR CRITIQUE	<ol style="list-style-type: none">1. Sum up and clarify the lesson.2. Reemphasize important points.3. Correct errors made during application and examination stages.

HINTS ON ORAL INSTRUCTION

THE INTRODUCTION

1. REASON: Arouse interest in the subject.
2. CHARACTERISTICS: Brief, clear and convincing.
3. ELEMENTS IN EVERY INTRODUCTION:
 - a. Objective of lesson: Tell students what is to be learned.
 - b. Reasons for learning: Stress battle importance.
 - c. Standards expected: Let students know exactly what is expected of them.
4. INTRODUCTION MAY ALSO INCLUDE:
 - a. Brief statement of procedure to be followed.
 - b. Review of previous instruction.

HINTS ON CLASS MANAGEMENT

1. Before the class begins, check on seating arrangement, lighting, ventilation, instructional material, equipment, training aids, and assistant instructors.
2. Beginning the class tell students the nature and purpose of the instruction; why it is important to them; specifically, what is expected of them.

3. Present the instruction forcefully and enthusiastically.
4. Be alert to class reactions and maintain discipline.
5. Direct questions to inattentive students.
6. Question students frequently to check their understanding and to keep the class alert. Recognize correct answers, correct wrong ones.
7. Have sleepy students stand at rear or side of class area.
8. Don't allow students to waste class time arguing a point.
9. Handle problem cases by individual instruction.
10. Illustrate important points with visual aids in realistic examples or illustrations.

TIPS ON DELIVERY

1. Get the attention of the group before beginning.
2. Be sure that you can be heard.
3. Enunciate clearly and pronounce correctly.
4. To get emphasis use: repetition, gestures, pauses, and variation in rate of speaking and pitch and volume of voice.
5. Speak in a conversational tone.
6. Look directly at and speak directly to students.
7. Do not make excuses.
8. Adapt words and sentences to group. Don't talk down to students.
9. Avoid use of monotonous connectives. (Example: "Now we'll go into").
10. Show a genuine interest in students and subjects.
11. Maintain correct bearing.
12. Use definite opening and strong, conclusive closing statements.

TIPS ON QUESTIONS AND QUESTIONING

Ask questions which:

1. Have a specific purpose.
2. Are clear and concise.
3. Emphasize one point only.
4. Require definite answers.
5. Are phrased so as to discourage guessing.
6. Are related to the "how" and "why".

Procedure in asking a question:

1. Ask the question.
2. Pause briefly.
3. Call on individual student by name.
4. Recognize and evaluate student's response.

PROPER USE OF TRAINING AIDS

USE OF TRAINING AIDS IN GENERAL

1. Prepare in advance drawings or data that consume time.
2. Keep aids covered when not in use.
3. Introduce aids at proper time.
4. Display aids where entire class can see.
5. Stand so as not to obstruct view of class.
6. Use pointer to focus attention on specific parts.

7. Talk to class, not to aids.
8. Display aids smoothly and skillfully.
9. Train and use assistants to best advantage.

TRAINING FILMS

Steps in using training films:

1. Preview and select film for specific instructional purposes.
2. Introduce film properly. Tell students what it is about and what to look for.
3. Test students on film content.
4. Discuss film and test.

USING THE BLACKBOARD

1. Rehearse drawings before class meets.
2. Place work on the blackboard quickly, and legibly.
3. Use colored chalk for contrast and emphasis.
4. Use a pointer.
5. Give men time to take notes.
6. Erase work when it is no longer needed.

PLANNING AND GIVING A DEMONSTRATION

1. Plan the details of the demonstration.
2. Arrange all tools and equipment properly.
3. Follow a written lesson plan.
4. Demonstrate only one operation at a time.
5. Show how and explain how at the same time, using assistant instructors to greatest advantage.
6. Omit unnecessary information.
7. Emphasize safety precautions.
8. Use visual aids to the greatest advantage.
9. Avoid awkward gaps.
10. Check frequently with questions to make sure students understand.
11. Encourage students to ask questions.
12. Emphasize the essential points.
13. Set high standards for students by skillful demonstration.
14. Present a summary.

CONDUCTING PRACTICAL WORK

1. Give detailed directions to students.
2. Be sure that students know the "how" and "why".
3. Inform students as to standards expected.
4. Allow sufficient time to attain standards set.
5. Keep instruction first, production secondary.
6. Supervise closely and constantly.
7. See that men perform correctly.
8. Learn each step before progressing to the next.
9. Reteach and redemonstrate when need arises.

10. Stress both speed and accuracy after procedure is learned.
11. Make application realistic.
12. Ask pertinent questions during practical work.
13. Be patient and encouraging.
14. See that all safety precautions are observed
15. Show positive interest in student progress.
16. Have good students aid slower students.
17. Help students evaluate their performance.
18. Rotate students from one job to another.

HOW TO CONDUCT A CRITIQUE

(All applicatory exercises should close with a critique)

1. State the objective of the lesson or problem.
2. Review procedures employed.
3. Evaluate strong points and suggest improvements.
4. Control the group in discussion.
5. Summarize.

SUPERVISING INSTRUCTION -- CLASS VISITATION

1. Scheduled visits are unannounced.
2. Visit for complete period of instruction.
3. Study specific aspects of instruction.
4. Appraise the whole situation.
5. Refrain from taking part in class activities except to correct glaring errors.
6. Keep a record of the results of observation.
7. Discuss instruction with instructor privately.

SOME PRINCIPLES DEMONSTRATED IN

CAMPAIGN FIRE

A TRAINING FILM

1. Two general types of suppression organization:
 - a. Initial Attack (small crew)
 - b. Campaign Fire (larger crews)
2. Need for organizing for a Campaign Fire must be recognized early and action initiated promptly.
3. Fire Headquarters established at once.
4. Fire Boss estimates personnel, supervision and equipment required and makes specific requests to the Fire Dispatcher.
5. Fire Dispatcher uses the Fire Plan as a ready reference to manpower, supervision and equipment resources.
6. Fire Boss keeps himself free to plan and manage by appointing staff aids to whom he can delegate certain parts of the job.
7. Fire Boss makes clear-cut decisions and announces them in the form of definite, logical and specific orders.
8. Initial orders are oral and fragmentary. Subsequent orders are written and complete.
9. Initial scouting is by airplane which is supplemented by ground scouts with portable radios.
10. Organization build-up is based on NFED. Initially the Fire Boss handles the jobs of both "Plans Chief" and "Service Chief". As the pressure on his time and thinking increases, he delegates these jobs or parts of them to the appointed staff aids. This avoids interference with his basic job of Fire Boss.
11. A weather observer is called in as a part of the Campaign Fire organization.
12. Heavy equipment is used to build fire line wherever terrain, soil condition and fuel types permit.
13. Telephone, Radio and Messenger communication are used, each supplementing the others.

14. Fire Camp layout is based on several principles:
 - a. Parking area is nearest road-easy access and away from camp.
 - b. Kitchen is on line between sleeping areas and detrucking area- away from dust but on line of travel of men from sleeping area to trucks.
 - c. Wash racks for men are between kitchen and sleeping area.
 - d. Day sleeping area is shaded and away from noise of camp.
 - e. Latrine is isolated to afford privacy and sanitation.
15. Labor-saving devices are used in the Fire Camp wherever possible:
 - a. Paper dishes and cups eliminate dishwashing and promote sanitation.
 - b. A motor-generator unit provides good light - camp crew must operate 24 hours per day.
 - c. Men deposit garbage and eating utensils in proper containers thus eliminating clean-up crew.
16. Labor crews (or individuals) reporting in initially report first to Fire Headquarters for:
 - a. Registration.
 - b. Classification as to skills, experience and ability.
 - c. Assignment - position and crew.
 - d. Initiation of time record and assignment of a registration number.
17. Each individual is given a specific assignment:
 - a. To a specific classification (laborer, straw boss, truck driver, etc.).
 - b. To a specific crew or unit.
 - c. To a specific crew boss or supervisor.
18. Following assignment, men are kept together by crews, both on and off shift, under the supervision of their crew boss who is responsible for them at all times.
19. All check-out and check-in is by crew, as well as tool and blanket issue and turn-in, with the issue of meal tickets based on tool and equipment turn-in. All eating and sleeping is by crew units, each under its crew boss.
20. Time is kept by the crew boss, who turns in the daily time report to the time clerk at the end of each shift. Time clerk posts each man's time on his individual time slip which is filed by registration number.
21. Departure and return of each crew (and equipment operator) is reported to the "Plans Unit" where a current "Crew Status Board" is maintained.
22. Safety is emphasized at all times - proper tool handling and storage in trucks, spacing of men on the job, hard hats where needed, First Aid, etc.

13. Operation of Fire Headquarters include:

a. Special equipment such as map boards, telephone switchboard, etc.

b. Arrangement for relief of all personnel for sleep to include:

- (1) Radio and telephone operators
- (2) Cooks and helpers
- (3) Top staff personnel
- (4) The Fire Boss

c. Operation of "Message Center" (Message from Supply Officer to Dispatcher).

d. Operations Map and Assignment Sheets prepared by the "Plans Unit".

24. The early morning staff conference, Fire Boss and Top Staff, to plan the day's operation.

25. The Mop-up and Patrol action after fire is corralled.

26. The Board of Review immediately following the end of the fire. Purpose:

a. To reconstruct in detail the action of the fire and the suppression action taken to bring it under control, including dates, times, personnel and equipment.

b. To examine the above information in detail to determine:

- (1) Were the tactics, techniques and equipment employed the best that could have been used under the conditions prevailing?
- (2) If not, what procedures would have done the job better and in a shorter time?

c. To determine deficiencies in equipment, organization, training and planning and to make recommendations for the correction of such deficiencies.

d. To summarize "Lessons Learned" from this fire and to make such recommendations as appear pertinent from the above study.

It is recommended that the training officer review the film in advance, with notebook handy, as there will be other points he will wish to note and emphasize. Film should be returned promptly after use, with filled in report form (Form 471).

NOTE: The fire organization shown differs from the one used in Region 7 only in job titles. For example:

Film

Division Boss
Sector Boss
Crew Boss

Region 7

Sector Boss
Crew Boss
Straw Boss

Military Training Films

for

FIRE CONTROL TRAINING

<u>Release No.</u>	<u>Title</u>	<u>Running Time</u>
5-12	Map Reading	43 Min.
7-265	Sand Table Part I - Preparation	27 Min.
7-266	Sand Table Part II - Use	20 Min.
7-295	Military Training	58 Min.
19-1490	Point Control of Traffic	24 Min.
19-1579	Traffic Patrols & Escorts	22 Min.
21-2071	Basic Map Reading - Part I (Conventional signs)	20 Min.
21-2072	Basic Map Reading - Part II (Elevation, Distance & Grid)	27 Min.
21-2073	Basic Map Reading - Part III (Orientation & Location with a compass)	34 Min.
21-2075	Basic Map Reading - Part IV (Photos & Photomaps)	23 Min.

A SIMPLE METHOD OF DESIGNATING MAP LOCATIONS

A problem confronting any forest fire control organization is that of identifying a point on a map in a manner that will permit a person on the receiving end of a telephone or radio transmission to locate quickly and accurately the same point on his map.

One solution is afforded by the "thrust-line" method. This method is frequently used by the armed forces in situations where gridded maps are not available. In the early days of World War II it was noted that maps captured from Rommel's troops often had one or more straight lines drawn on them. Subsequent interrogation of prisoners disclosed the details of the "Thrust Line" method of designation of map locations, described below. The advantages of this system were so readily apparent that it was adopted and widely used by allied forces. Its simplicity and flexibility makes it an ideal tool for forest fire control use.

In the most simple form it may be applied as follows:

1. Select two readily identified points on the map in the general area to be worked and as far apart as is convenient.
2. Connect them by a straight line. This is the "thrust line".
3. Designate and label one of the points as the "initial point" (I.P.). All measurements start at this point.
4. Designate other point of "thrust line" as the "point of extension" (P.E.).
5. Any location on the map may now be designated by a symbol consisting of two parts: Distance along the thrust line from the I.P., either forward (F) or back (B); distance right (R) or left (L) from that point at right angles to the thrust line.

An aid in applying this method is a paper, cardboard, or plastic right triangle having both of the sides graduated in the major map units and tenths of units, the zero of both scales being at the right angle of the triangle. By sliding the triangle along the thrust line with the "zero" forward and the required "F" distance at the I.P. the "R" or "L" distance may be plotted directly.

An example of the use of the thrust-line method is shown by the sketch map. Point No. 1 is designated F 1.7 L 2.0. Point No. 2 is identified as 4.3 R 2.8.

Many variations of this method may be developed to meet the need of special situations. Where a large area of map is to be covered it is best to establish several thrust lines well distributed over the area to be worked. In such cases it is necessary to identify each thrust line by a letter or number and to preface each point description by the identifying letter or number of the thrust line to which it pertains. For example, if the thrust line shown on the sketch map is thrust line III then the identifying symbol of point No. 2 would be III F 4.3 R 2.8.

In some cases it is necessary to place the I.P. well into the map because there is no easily identified point near the edge. In such cases the thrust line may be extended to the edge of the map and points on this extension line may be extended to the edge of the map and points on this extension shown as back (B) measurements. For example point No. 3 on the sketch map would be identified as 10.8 R 2.5. In all cases right and left are determined on the assumption that the observer is facing forward from the I.P.

The thrust-line method is most useful in cases where maps having grid lines or regular GLO subdivision land lines are not available. In an emergency the ordinary service station road maps can be used in combination with the thrust-line method to good advantage.

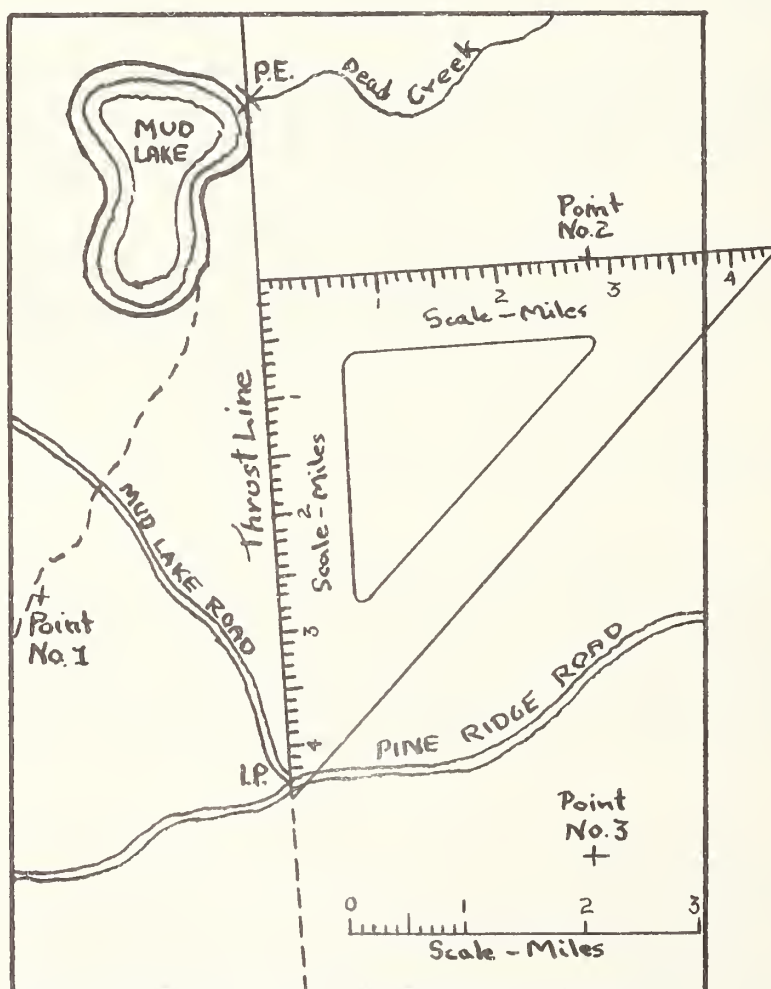
When two observers are using maps of different scale the same thrust-line symbols apply to both. However, each observer must plot locations according to his own map scale.

The principal advantages of the thrust-line method are: It is simple to teach and use. It may be applied to any map. A single identification symbol will apply to all maps of the same area, regardless of scale. It is accurate; chance of error is reduced to a minimum. It is brief; map point description by radio or telephone reduces transmission time to a minimum.

The major disadvantages of the method are: Each location must be plotted. The accuracy of location is dependent on accuracy of plotting.

This method is primarily valuable to fire control organizations as an emergency or stop-gap method pending the receipt of gridded or sub-divided maps.

Taken from FIRE CONTROL NOTES, Vol. 12, January 1951



F I R E O R D E R S

Fire Orders are orders directing operations on a fire. Over a long period of years experience has developed a natural sequence of issuing orders. The use of such a sequence:

- a. Enables the plan of the Fire Boss to be understood quickly.
- b. Insures that all essential instructions are covered.
- c. Provides a uniform practice of issuing orders throughout the fire organization.

Some individuals, when they think of Fire Orders, think that the sequence of the order is an object in itself. They consider that they are bound by red tape to certain jail-like cells. They are like the drunk who encountered a telephone pole on a dark night, felt his way carefully around it, then sat down and sobbed, "I'm walled in".

The purpose of training in Fire Orders is to form the habit of issuing orders and instructions in a logical form. In bridge we find an occasional individual who seems to have fifty-two slots in his brain. When a card falls he slips it into the correct slot and knows where it is. That is a habit developed from long practice. The same habit development in Fire Order training will enable fire supervisory personnel to form "brain slots" so that when "Information" is given it slips into slot number 1, when instructions pertaining to "Supply" or "Administration" are issued they automatically slip into slot number 4, etc.

The form of the Fire Order is a logical arrangement, finding application in all walks of life. For instance, each one of the paragraphs of a Fire Order contains the information arranged in the same order that would naturally be used if directions were given to a workman to perform a task:

- I. The workman would receive such information as was available on the difficulties that he would encounter and the help that he could expect. He would be oriented.
- II. He would be told in broad terms what was wanted.
- III. He would be given detailed instructions as to what he was to do and how he was to coordinate his efforts with those working around him.
- IV. He would be given instructions that would enable him to obtain the tools and materials needed.
- V. He would be told where to find the boss in case of difficulty.

Translating this into a basic form that we can follow in both written and oral orders we have:

FORM OF A FIRE ORDER

Location (or Fire Name)

Date _____
(Day and Hour)

I. Information

- a. The Fire
- b. The Suppression Force

II. Mission (The specific job to be done)

Must be a definite statement (To do so and so)

III. Detailed Instructions to Elements of the Suppression Force

Example (a. (Instructions to Sector I)
)b. (" " " II)
)(c. (" " Pumps)
)d. (" " Service Chief)

x (Instruction pertaining to all elements)

IV. Administration (Means of Accomplishment)

Example (a. Supply (Tool replacement and repair, fuel, etc.)
)b. Feeding
)(c. Time Slips
)d. Traffic Circulation
)(e. Equipment Maintenance & Repair
 etc.

V. Axis of Communication

Example (a. Location of Headquarters
) 1. Fire Headquarters
)(2. Sector Headquarters, etc.
)b. Use of Radio
)(c. Use of Telephone
)d. Use of Messengers
 etc.

Signature (Of Issuing Officer)

Distribution:

(Name of individuals
and org. elements to
receive a copy.)

Such Fire Orders may be issued in either written or oral form. In some instances the Fire Order may be issued initially as a verbal order to the supervisory personnel concerned and later confirmed in written form as reference. This might be done to save time in getting the orders into operation.

Fire Orders may also be issued as "complete orders" or as "fragmentary orders". A complete order contains full instructions on all phases of the operation. A fragmentary order covers only those items with which the operation is immediately concerned. Such an order might cover only items pertaining to paragraphs III and IV.

The type of order to be used is determined by the issuing officer. Time is the controlling factor in determining how a Fire Boss may best translate his decisions into orders. In the initial stages of a fire the rule may be complete written orders. Once the organization is established and operating fragmentary orders may be the rule with complete orders used only in the case of a major change in the situation.

In like manner the determination between written and oral orders must be made on the basis of service rendered. In general orders down to include Sector Boss should be written while those below that level are usually oral. The type of order and method of distribution must be determined on the basis of requirements. For example, in the early stages of a fire the Fire Boss may issue a series of fragmentary oral orders to various supervisory personnel in order to place his decision into action quickly. As soon as possible this would be followed by a complete written order confirming the previous oral orders and providing full coverage of the situation. The principal advantages of this method are:

1. Speed in application of the decision (oral fragmentary order).
2. Confirmation and reference. (Complete written order.)
3. Full information of the situation and part each is to play. (order.)

The matter of orders on a fire of any size is of prime importance. The success or failure of the plan of the Fire Boss may depend on the rapid transmission of that plan to all elements of the Fire Organization through the medium of a brief, clear, concise, and complete Fire Order. All members of a trained fire control organization will find that the Fire Order is an excellent tool which may be utilized to good advantage in fire control work.

INITIAL ACTION - FIRE BOSS

1. Review information furnished by State Dispatcher.
2. Send for the Warden in charge of the fire and send a replacement for him.
3. Determine initial location of Fire Headquarters.
4. Assign personnel to staff positions to be manned.
5. Call a staff meeting of Line Boss, Plans Chief & Service Chief at which the following action is taken:
 - a. Introduce self and staff members to each other if not acquainted.
 - b. Brief them on all information available.
 - c. Deliver all available maps to Plans Chief.
 - d. Indicate to Service Chief general location of Fire Headquarters and direct him to take charge of all transportation and communication equipment present on the fire.
 - e. Discuss and decide on initial plan of attack, and plan of employment of personnel and equipment now present.
 - f. Ask Service Chief to call in the Communications Officer.
 - g. Staff and Comm. Officer then decide on initial communications plan. (Correlate it with "e" above).
 - h. Request staff sections to submit within one hour:
 - (1) Estimate of the Fire Situation (Plans Ch.) States E.E.I.
 - (2) Estimated personnel and equipment requirements for suppression force. (Line Boss).
 - (3) Estimated Communications requirement. (All).
 - (4) Estimated personnel, equipment and supply requirements. (Each staff section).
 - (5) Recommended detailed layout of the Fire Headquarters. (Service Ch.).

INITIAL ACTION - LINE BOSS

1. Attends Staff Conference with Fire Boss and Staff at which he:
 - a. Presents plan for initial employment of personnel and equipment now present on the fire.
 - b. Present general plan of attack (general) based on present information.
 - c. States his E.F.I. (Essential Elements of Information) to Plans Chief.
 - d. Presents his estimated personnel and equipment requirements for the Line Organization.
 - e. Presents initial communication and transportation requirements of the Line Organization.
2. Calls Sector Bosses into conference at which he:
 - a. Briefs them on the situation.
 - b. Makes tentative Sector assignment.
 - c. Outlines initial plan of attack and each Sector's part in it.
 - d. Instructs them in details of operation such as:
 - (1) Channels of communication.
 - (2) Responsibilities and authority (including chain of authority).
 - (3) System of handling feeding, change of shift, transportation, etc.
 - (4) General techniques of fire fighting he wants employed (hand tools, dozer, pumps, line firing, etc.).
 - (5) Method and frequency of keeping him informed.
3. With Plans Chief prepares detailed plan of assignment of incoming personnel to be turned over to the Line Organization.

4. Keeps Fire Boss and Plans Chief continually informed of status and progress of suppression effort and conditions on the line.
5. Presents all plans for major changes in tactics or operations to the Fire Boss for approval prior to execution. Also insures that other staff action is coordinated with line action by working closely with the Plans Chief.
6. After suppression force is organized and in operation he makes frequent inspections of the suppression effort with the Sector Bosses, being sure to specifically delegate his authority to act to a responsible individual before leaving the fire headquarters.

INITIAL ACTION - PLANS CHIEF

1. Calls his staff together immediately, following position assignment by the Fire Boss, and directs:
 - a. Intelligence Officer to:
 - (1) Organize and brief his section.
 - (2) Collect any information possible on the fire by telephone or other means.
 - (3) Prepare list of transportation and communication equipment required immediately for the scout section.
 - (4) Have scout section ready for final briefing and assignment immediately following the conference with the Fire Boss.
 - b. Records Officer to:
 - (1) Organize his section and prepare for immediate operation.
 - (2) Provide Plans Chief with two runners to accompany him to the Fire Boss conference.
 - (3) Have Time Clerk initiate time records for all personnel now on fire.
 - (4) Have Fire Log started.
 - (5) Organize Message Center and start its operation.
2. Calls a meeting of the Top Staff at the direction of the Fire Boss and participates by:
 - a. Keeping detailed notes on all information, plans and decisions resulting.
 - b. Receive maps and presents plan for their distribution for approval of the Fire Boss.
 - c. Participate in plan discussions and presents ways by which the Plans Section can facilitate operations and handle details.

- d. Uses his runners to carry messages (such as sending for Communication Officer).
 - e. Works with Line Boss on assignment plan for new personnel to be assigned to Line Organization.
3. Calls a meeting of the Plans Staff at which he:
- a. Briefs them on all information and developments to date.
 - b. Turns maps over to Intelligence Officer with data for Thrust Line establishment and map distribution.
 - c. Turns all informational data received from the Fire Boss over to the Records Officer.
 - d. Gives data on assignment plan for new men (worked out with the Line Boss) to Records Officer for preparation of plan and distribution (Line Boss - 1 Service Chief - 2 Records - 1).
 - e. Requests Records and Intelligence to give him, in one hour:
 - (1) Summary of the fire situation.
 - (2) An estimate of personnel, equipment, transportation and supplies required to operate the section.

INITIAL ACTION - SERVICE CHIEF

1. Attends staff conference with Fire Boss at which he
 - a. Keeps notes on developments to date.
 - b. Learns general location of Fire Headquarters and proposed operations of other sections.
 - c. Requests:
 - (1) No. men now on fire and proposed schedule of build-up (from Plans Chief).
 - (2) Immediate transportation and communication requirements of Line and Plans Sections.
 - (3) Equipment now on fire and estimated requirements. (All).
 - (4) Proposed feeding requirements for D/1.
 - d. Notes that he is to submit a detailed layout of the Fire Headquarters and Camp to Fire Boss for approval. (In one hour.)
 - e. Calls in Communication Officer and participates in preparing the initial communication plan.
2. Calls a meeting of his staff (Supply Officer, Camp Boss, Communication Officer and Transportation Officer) at which he:
 - a. Briefs them on all information to date.
 - b. Directs Camp Boss to check "on" the headquarters site designated by the Fire Boss and prepare a plan for the proposed headquarters for approval of the Fire Boss. (Must be ready in one hour).
 - c. Advises Camp Boss:
 - (1) Number of men now on the fire.
 - (2) Scheduled arrivals of additional personnel.
 - (3) Messing requirements for noon and evening meals.

- (4) Estimated period of operation, personnel strength, etc.
- (5) Necessity of furnishing Supply Officer with specific requisitions for all camp needs for at least the next 2-day period. To be completed in one hour.
- (6) To determine personnel and transportation requirements for camp operations. (Report needed in one hour.)

d. Advises Supply Officer:

- (1) Proposed schedule of build-up of suppression force.
- (2) Estimated equipment requirements of all sections will be furnished him within one hour.
- (3) To prepare a list of all equipment now on the fire and a schedule of distribution, for Service Chief approval.
- (4) To consolidate all requisitions promptly for submission to the State Dispatcher.
- (5) Establish gas and oil supply promptly.
- (6) To determine personnel and transportation requirements to operate the section. (Report needed in one hour.)

e. Requests Communication Officer:

- (1) Establish Message Center communication equipment promptly.
- (2) Prepare Fire Communication Plan, based on list of requirements to be available in one hour, for approval of Fire Boss.
- (3) Prepare requisition for communication equipment required to implement the proposed plan and submit to Supply

Officer promptly.

- (4) Advise of personnel and transportation requirements to operate the section. (Report needed in one hour.)

f. Requests Transportation Officer:

- (1) Take over all transportation equipment now on the fire.
- (2) Establish a checking station at once - correlate with Plans Chief.
- (3) Correlate use of radio-equipped vehicles with the Communication Officer.
- (4) Confer with Plans Chief and schedule use of available transportation to best meet the immediate suppression need.
- (5) Determine personnel and equipment requirements to operate the section - report in one hour.
- (6) Prepare recommended traffic circulation plan for fire area and submit to Service Chief for approval.

LEGEND

(Fire Operations Map)






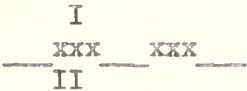

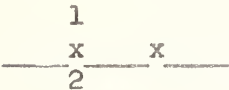





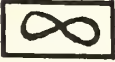

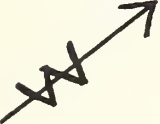











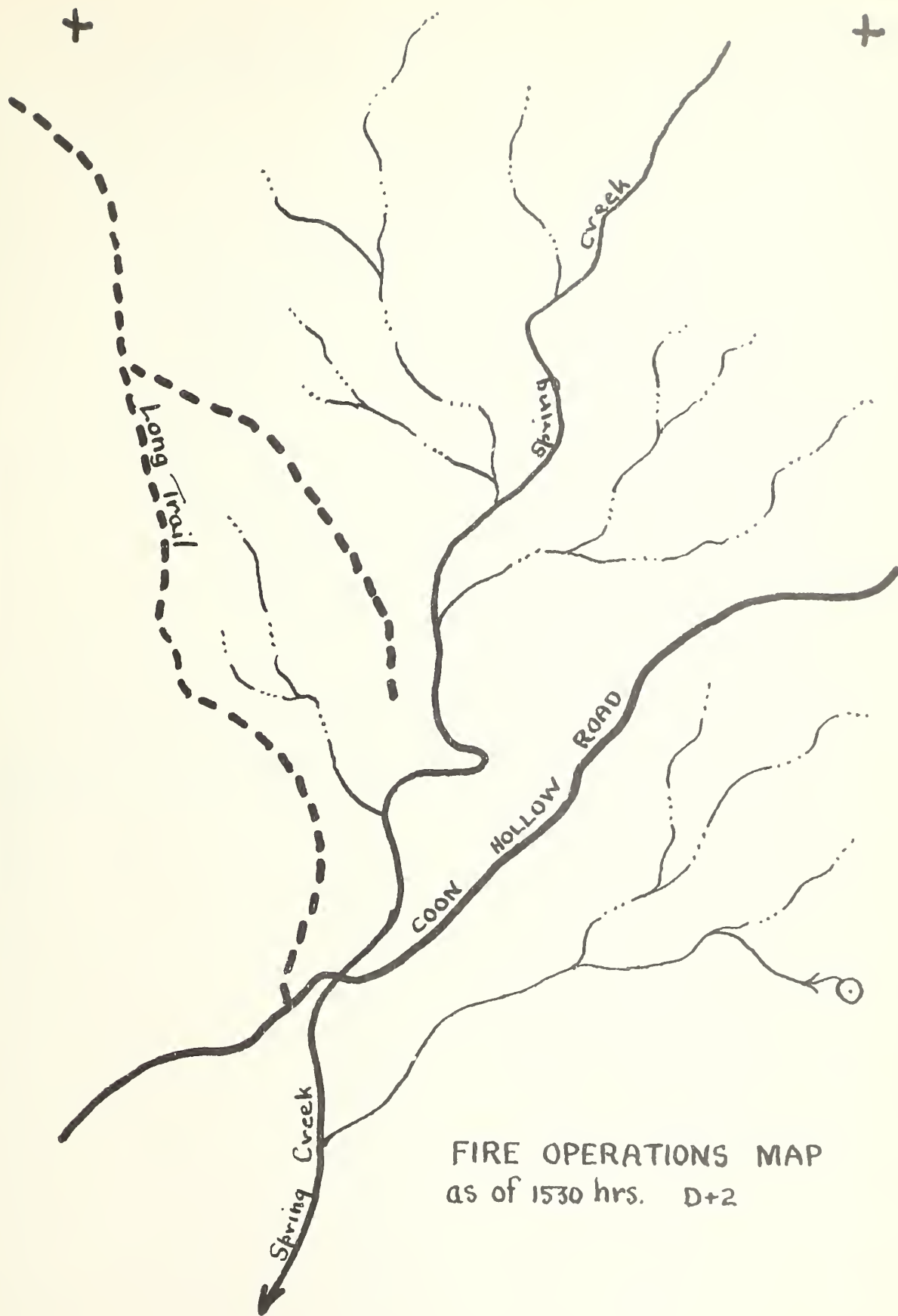
<u>Symbol</u>	<u>Feature</u>	<u>Color</u>
	Base Fire Camp	Black
	Fly Camp	"
	Fire Headquarters	"
	Division Headquarters	"
	Sector Headquarters	"
	Division Boundary	"
	Sector Boundary	"
	Crew Section Boundary	"
	Radio Set - Fixed Station	"
	Radio Set - Mobile (Vehicle Mounted)	"
	Radio Set - Portable (Walkie-Talkie or Pack)	"

FIG. #16

<u>Symbol</u>	<u>Feature</u>	<u>Color</u>
	Telephone - Field Line	Black
	Telephone - Commercial Line	"
	Air Strip or Water Landing Area	"
	Air-Drop Zone	"
	Wind Direction	"
	Power Pump Site - Unoccupied	Blue
	Power Pump Site - Occupied	"
	Tank Truck - with power pump & hose	"
	Bulldozer	"
	Fuel & Lube Dump	Black
	Drinking Water	"
	Tool Cache or Dump	"

<u>Symbol</u>	<u>Feature</u>	<u>Color</u>
	Fire Edge	Red
	Spot Fire	"
	Line Construction in Progress	Blue
	Controlled Line	"

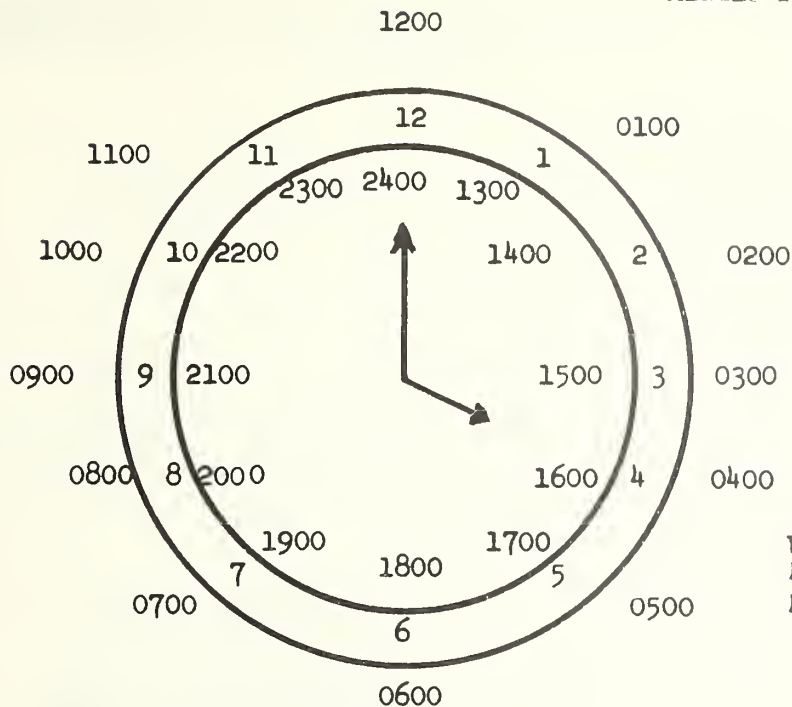


FIRE OPERATIONS MAP
as of 1530 hrs. D+2



THE 24-HOUR TIME SYSTEM FOR
TIMEKEEPING FUNCTION ON LARGE FIRES

Outer figures AM 24-hour
Inner figures PM 24-hour
Middle figures regular time



Example:
4:00 AM - 0400
4:00 PM - 1600

TIME CHART

Midnight (beginning of day)	0000		
12:30 A.M.	0030	12:30 P.M.	1230
1:00	0100	1:00	1300
1:30	0130	1:30	1330
2:00	0200	2:00	1400
2:30	0230	2:30	1430
3:00	0300	3:00	1500
3:30	0330	3:30	1530
4:00	0400	4:00	1600
4:30	0430	4:30	1630
5:00	0500	5:00	1700
5:30	0530	5:30	1730
6:00	0600	6:00	1800
6:30	0630	6:30	1830
7:00	0700	7:00	1900
7:30	0730	7:30	1930
8:00	0800	8:00	2000
8:30	0830	8:30	2030
9:00	0900	9:00	2100
9:30	0930	9:30	2130
10:00	1000	10:00	2200
10:30	1030	10:30	2230
11:00	1100	11:00	2300
11:30	1130	11:30	2330
Noon	1200	Midnight (end of day)	2400

Four digit time must be used. 10:45 P.M. would be written 2245; 6:50 A.M. would be written as 0650, etc.

TRANSPORTATION DATA

Purpose	Requirement	Number for			Rate of Travel Loaded		
		25 Men	50 Men (Per Shift)	100 Men	Main Highway	Secondary Highway	Truck Trail
Adm.	Sedan, Pickup, Jeep	2	5	12	45	40	15
Personnel Trans.	1½ Ton	2	3	5	30	20	10
Heavy Equip.	As needed		As needed		30	10	3
Supply Trans.	1½ Ton	1	1	2	30	20	10
Supply Trans.	Pack Mules 1 rd. trip/day	4	8	16	Trail 2½	Ridge Top 1	
Supply Trans.	Cargo Plane	Capacity of Plane			Loading 1600 lbs/hr.	Dropping 1600 lbs/hr.	Travel 100 mph

Maintenance units as needed

WEIGHTS AND VOLUMES OF PACKAGED PETROLEUM PRODUCTS

1	2	3	4	5	6	7	8	9	10
Product	Packaging	Weight (lbs)	Actual cubic feet	Mean cubic feet	Packages per short ton	Gallons per short ton	Capacity of vehicles for carrying filled containers		
							1-T Tlr	1½-T Trk	2½-T Trk
1 Aviation gasoline	Bulk	.....	.....	.....	.....	335	.....	.....	.....
	55-gal drms	359	11.2	12	5.57	290	6	12	18
	5-gal cans	41.1	.95	1	48.7	248	50	75	200
2 80-octane	Bulk	.....	.....	.....	.....	326	.....	.....	.....
	55-gal drms	378	11.2	12	5.29	273	6	12	18
	5-gal cans	41.9	.95	1	47.7	241	50	75	200
3 Diesel fuel	Bulk	.....	.....	.....	.....	286	.....	.....	.....
	55-gal drms	423	11.2	12	4.73	243	5	10	17
	5-gal cans	46.2	.95	1	43.3	216	45	70	185
4 Kerosene	Bulk	.....	.....	.....	.....	294	.....	.....	.....
	55-gal drms	407	11.2	12	4.91	252	6	12	18
	5-gal cans	45.2	.95	1	44.2	226	50	75	200
5 Lubri- cating oils	Bulk	.....	.....	.....	.....	263	.....	.....	.....
	55-gal drms	455	11.2	12	4.40	230	4	8	16
	5-gal cans	49.2	.95	1	40.7	205	40	65	180
	1-qt. cans	34.5	.88	.88	58.0	...	60	90	210
	(12 per case 1-qt. cans	60	1.6	1.6	33.4	...	40	65	130
	24 per case 5-qt. cans	77	1.9	1.9	26.0	...	30	45	100
	6 per case								
6 Greases	25-lb. pail	29	.95	1.04	69.0	...	50	75	200
	5-lb. cans	44	1.1	1.1	45.4	...	40	65	170
	6 per case								

Weights and Volumes of Packaged Petroleum Products (Cont'd).

- 1 55-gallon drums (18 gage drums weigh 51 pounds empty) are normally filled to 53 gallons.
- 2 For planning purposes weight of gasoline may be taken as 42 pounds per 5-gal can, and weight of engine oil for motors may be taken as 9.5 pounds per gallon, including weight of container (5-gallon can).

CONVERSION FACTORS---PETROLEUM PRODUCTS

1	2	3	4	5	6	7	
1	Item	Unit	Type package	Not packaged		In packages	
				Gallons to pounds	Pounds to Gallons	Gallons to pounds	Pounds to gallons
2	Aviation gas	Gallon	55-gallon drum	5.83	0.171	7.340	0.1360
3	Motor gas	Gallon	55-gallon drum	6.17	.162	7.680	.1300
			5-gallon can			8.160	.1230
4	Kerosene	Gallon	55-gallon drum	6.76	.148	8.270	.1210
5	Diesel oil	Gallon	55-gallon drum	7.24	.138	8.750	.1140
			5-gallon can			9.250	.1080
6	Lubricating oil	Gallon	55-gallon drum	7.51	.133	9.020	.1110
			5-gallon can			9.490	.1050
7	Residual oil	Gallon	55-gallon drum	7.88	.127	9.390	.1070
			5 gallon can			9,900	.1010
8	Grease	Pound	25-pound can	.....	.....	.....	.....

1 drum = 55 U.S. Gallons (drums are usually filled to 53 gallons at 60° F. allowing 2 gallons for expansion).

1 drum = 80 pounds empty.

1 drum = 12 cubic feet.

1 can = 10 pounds empty

1 can = 1 cubic foot

GASOLINE AND OIL REQUIREMENTS GUIDE

Gallons of gas and oil required:

Type Vehicle (Loaded)	*Per 100 Miles							
	State Highway		County Roads		Truck Trails		Fire Lines, etc.	
	Gas	Oil	Gas	Oil	Gas	Oil	Gas	Oil
Sedan.....	5.5	.5 pt.	6	.5 pt.	6.5	.6 pt.	10.0	.6 pt.
Pickup.....	6.0	.5 "	6	.5 pt.	10.0	.6 pt.	12.5	.6 pt.
4x4 Dodge.....	10.0	.6 "	10	.6 "	12.0	.7 "	14.0	.7 pt.
4 x 4 M. Herr.....	12.5	.6 "	14	.6 "	20.0	.7 "	25.0	.7 pt.
Transport (gas)...	16.5	.6 "	20	.6 "	25.0	.7 "	33.0	.7 pt.
S.Side, Reg.....	10.0	.6 "	12½	.6 "	16.5	.7 "	20.0	.7 pt.

Gallons of diesel fuel and oil required

Type Vehicle (Loaded)	*Per 100 Miles							
	Fuel	Oil	Fuel	Oil	Fuel	Oil	Fuel	Oil
Transport 10 T....	14.0	1.7 pt.	17.0	1.7 pt.	20	1 qt.	--	--
Transport 15-20 T.	17.0	1.7 pt.	20.0	1.7 pt.	25	1 qt.	--	--

Type Tractor	*Per Hour of Operation							
	Walking Ave. Cond.		Heavy Cover		Medium Cover		Light Cover	
	Fuel	Oil	Fuel	Oil	Fuel	Oil	Fuel	Oil
D-4, TD-9	1.5	.9 pt.	2.3	1.4 pt.	2.0	1.2 pt.	1.6	1.1 pt.
D-6, TD-14.....	2.0	1.0 "	3.7	1.5 "	3.1	1.3 "	2.5	1.1 "
D-7, TD-18.....	3.0	1.1 "	4.6	1.6 "	3.9	1.4 "	3.1	1.2 "
D-8, HD-14.....	4.0	1.2 "	7.2	1.7 "	6.0	1.5 "	4.8	1.3 "

* Note: It is necessary for the Service Organization to estimate the number of miles or hours of operation per shift different types of vehicles will operate on the fire to determine the amount of fuel and lubricants to order and have on hand.

ENGINE OIL REQUIREMENTS

The figures shown are for average consumption, plus oil drain.

Oil drain period for vehicles is 3,000 miles.

Oil drain period for tractors is 80 hours.

The crankcase capacities for cars, pickups and 1½ ton trucks averages 6 qts., for transports, 20 qts., and for tractors, 17-30 qts.

GEAR OIL REQUIREMENTS

Drain period for most tractor gear cases is 480 hours.

Drain period for vehicles is 9,000 miles.

Replenishment of gear oil because of loss through leaks or repairs would constitute the only requirement for this type lubricant.

Gear oil is supplied in drums of the following capacities:

400 lbs.

100 lbs.

35 lbs.

10 lbs.

5 lbs.

1 lb.

Drums such as 35# size are desirable to permit ready distribution if necessary.

CHASSIS AND TRACK ROLL LUBRICANTS

Lube intervals for vehicles is 500 miles.

The average chassis lubricant required per service is ½ lb.

Lube intervals for tractors is based on progressive procedures. Some parts require daily lubrication; other parts every 40 hours, etc.

The average Track Roll Lubricant required to service a tractor daily averages 2 to 4 lbs., depending upon condition of the unit.

These lubricants are supplied in the same size containers as for gear oil and smaller sizes are desirable.

OTHER LUBRICANTS

Water Pump Lubricant and Wheel Bearing Lubricant are desirable. Consumption is limited in both instances and quantities can be held to a minimum.

STANDARD TOOL LIST FOR FIRE LINE WORK

	: 25-Man Unit		: 50-Man Unit		: 100-Man Unit	
	: Shift	: 3 days	: Shift	: 3 days	: Shift	: 3 days
<u>Cutting Tools</u>						
Axes	: 8	: 18	: 15	: 34	: 30	: 69
Hooks, brush	: 3	: 6	: 6	: 14	: 12	: 28
Pulaskis or forestry axe	: 3	: 6	: 6	: 14	: 12	: 28
<u>Scraping Tools</u>						
Hoes, hazel or mattock	: 4	: 8	: 8	: 18	: 16	: 36
Rake, fire	: 8	: 15	: 15	: 34	: 30	: 69
Shovels	: 8	: 18	: 15	: 34	: 30	: 69
<u>Miscellaneous Equipment</u>						
Backpack pumps	: 6	: 12	: 12	: 24	: 48	: 96
Canteen	: 25	: 50	: 50	: 100	: 100	: 200
<u>Line Firing Equipment</u>						
Drip torch	: 1	: 2	: 2	: 3	: 2	: 4
Fuses, dozen	: 2	: 4	: 4	: 8	: 8	: 16
Other						
<u>Special Equipment (order as needed)</u>						
Brooms						
Power saws						
axe, wedges, fuel						
Pruning shears						

FIRE TOOL REQUISITION

1. For..... Date..... Time.....
 Location.....

No. Required	Item	No. Returned
.....	Axes.....	.....
.....	Hooks, Brush.....	.....
.....	Pulaski or forestry axes.....	.....
.....	Hoes, Hazel or cutter mattock.....	.....
.....	Rakes, Fire.....	.....
.....	Shovels.....	.....
.....	Backpack pumps.....	.....
.....	..... filled..... empty.....	.....
.....	Drip torch.....	.....
.....	Fuses.....	.....
.....	Brooms.....	.....
.....	Power saws.....	.....
.....	Pruning shears.....	.....
.....	First Aid kit.....	.....
.....	Headlight w/batteries.....	.....
.....	Files w/handles.....	.....
.....	Knapsacks.....	.....
.....	Radio..... Type.....	.....
.....	Canteens, filled.....	.....
.....	Lunches.....	.....
.....
.....
.....
.....
.....
.....
.....

Ordered by.....

Filled by.....

Received by.....

1. Sector 1; or Jones' Crew; or Flk Fire Camp

Instruction for Use of Fire Tool Requisition

1. Prepare form in duplicate.
2. Form will be filled out by Sector Boss or Crew Boss.
3. Give one copy of form to Service Chief at once, who passes down to Tool Tender.
4. Tool Tender will enter number of tools returned on his copy and file.

Chart No. I

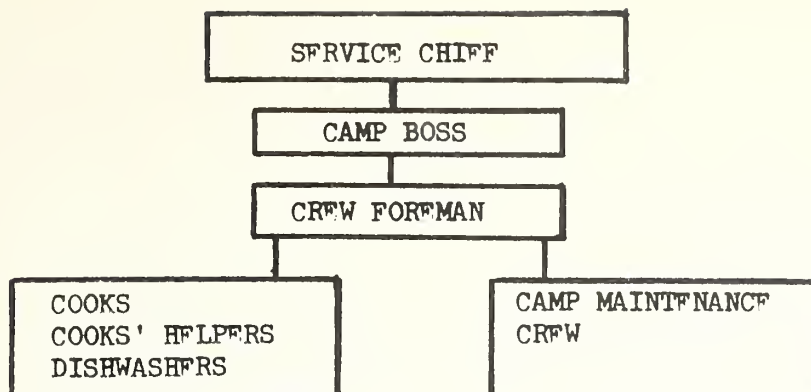


Chart No. II

SAMPLE FIRE CAMP LAYOUT

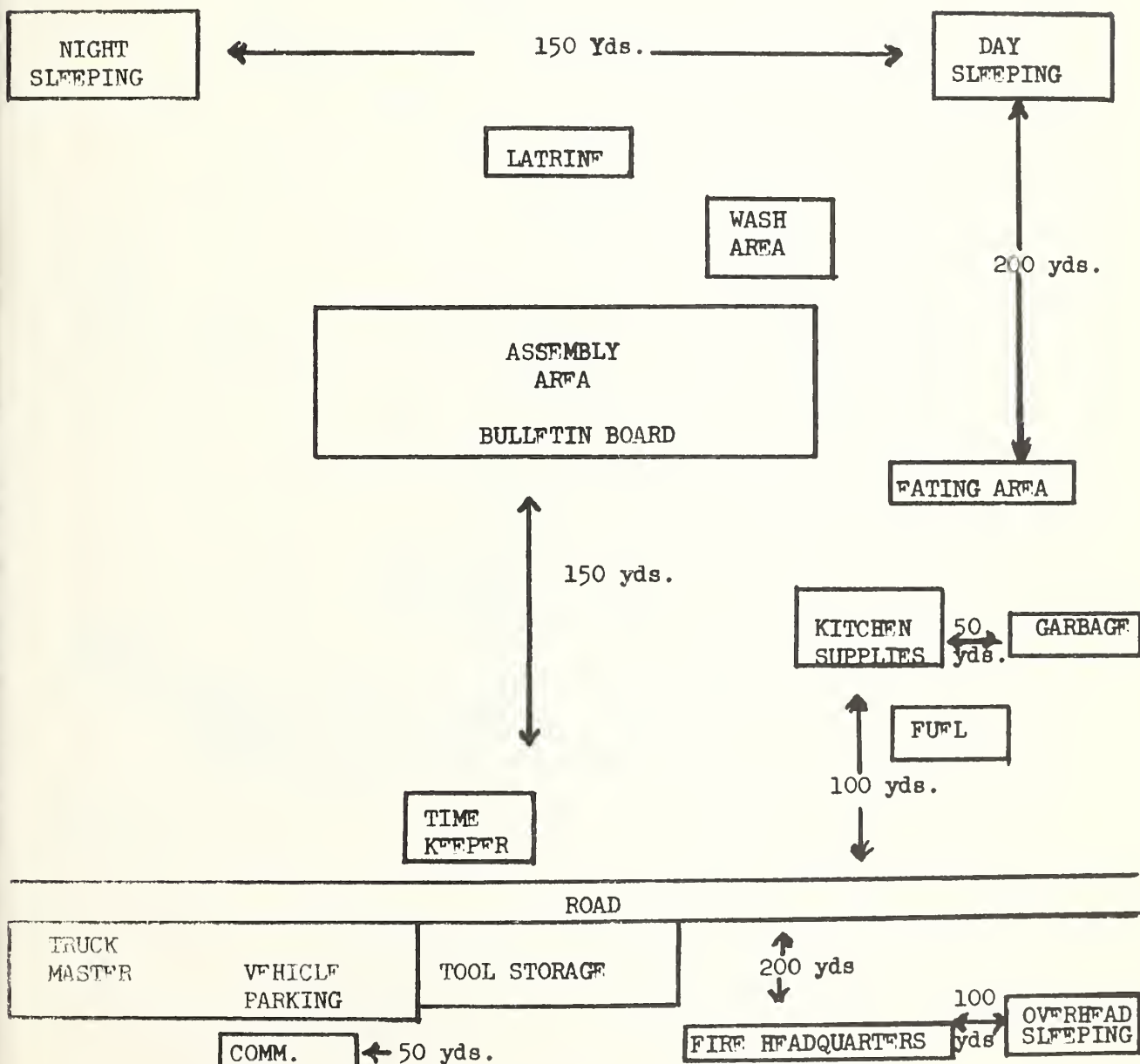
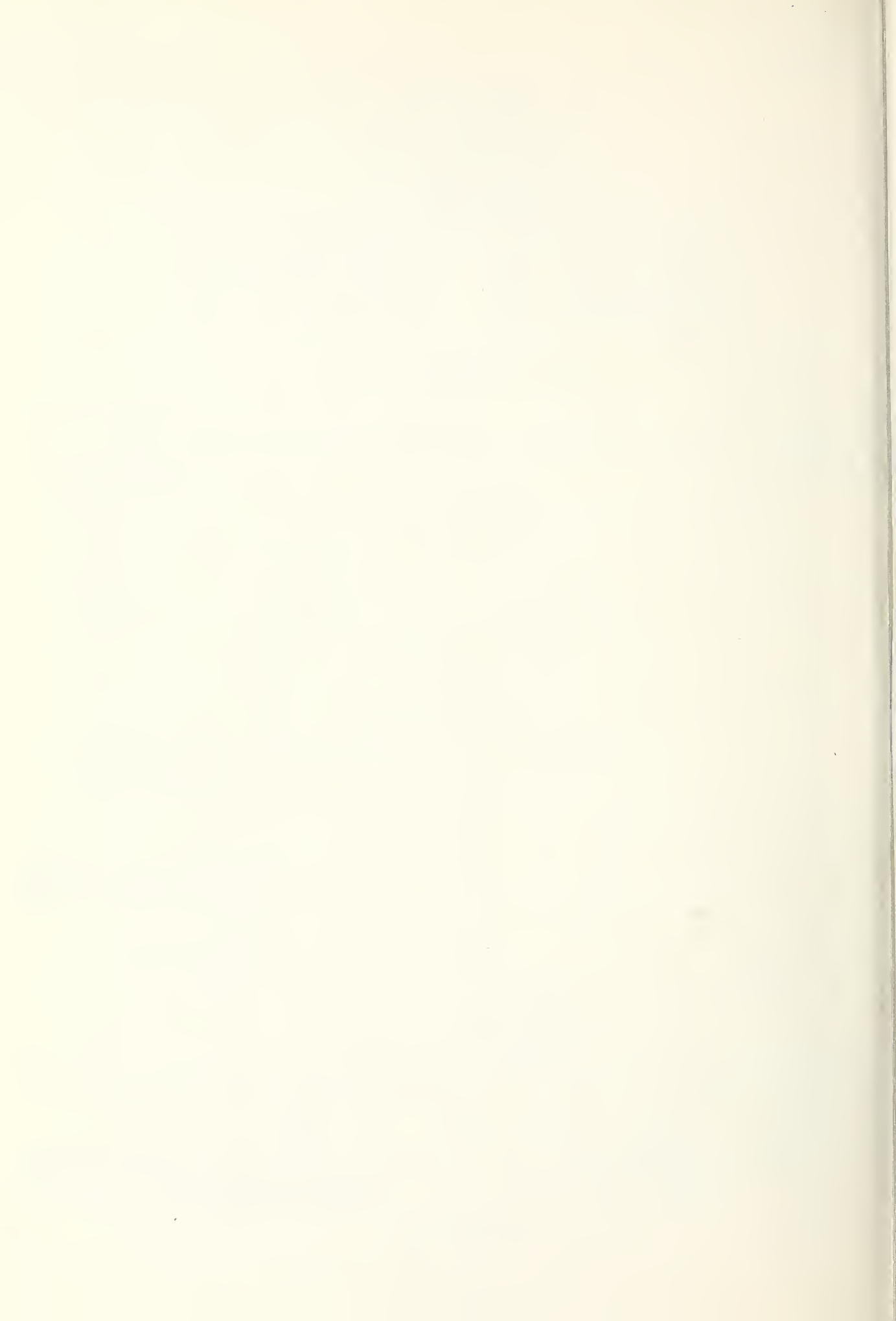
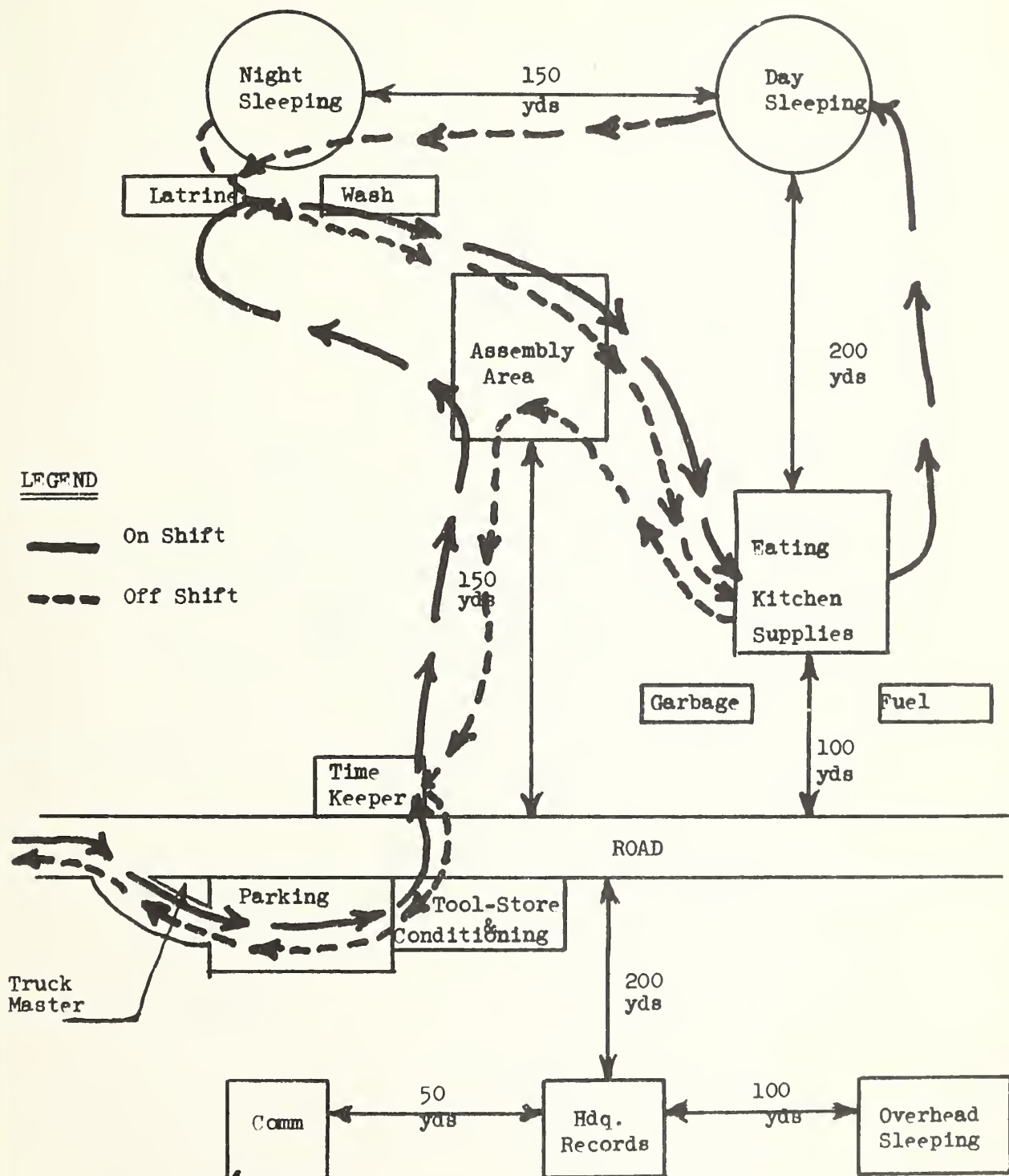


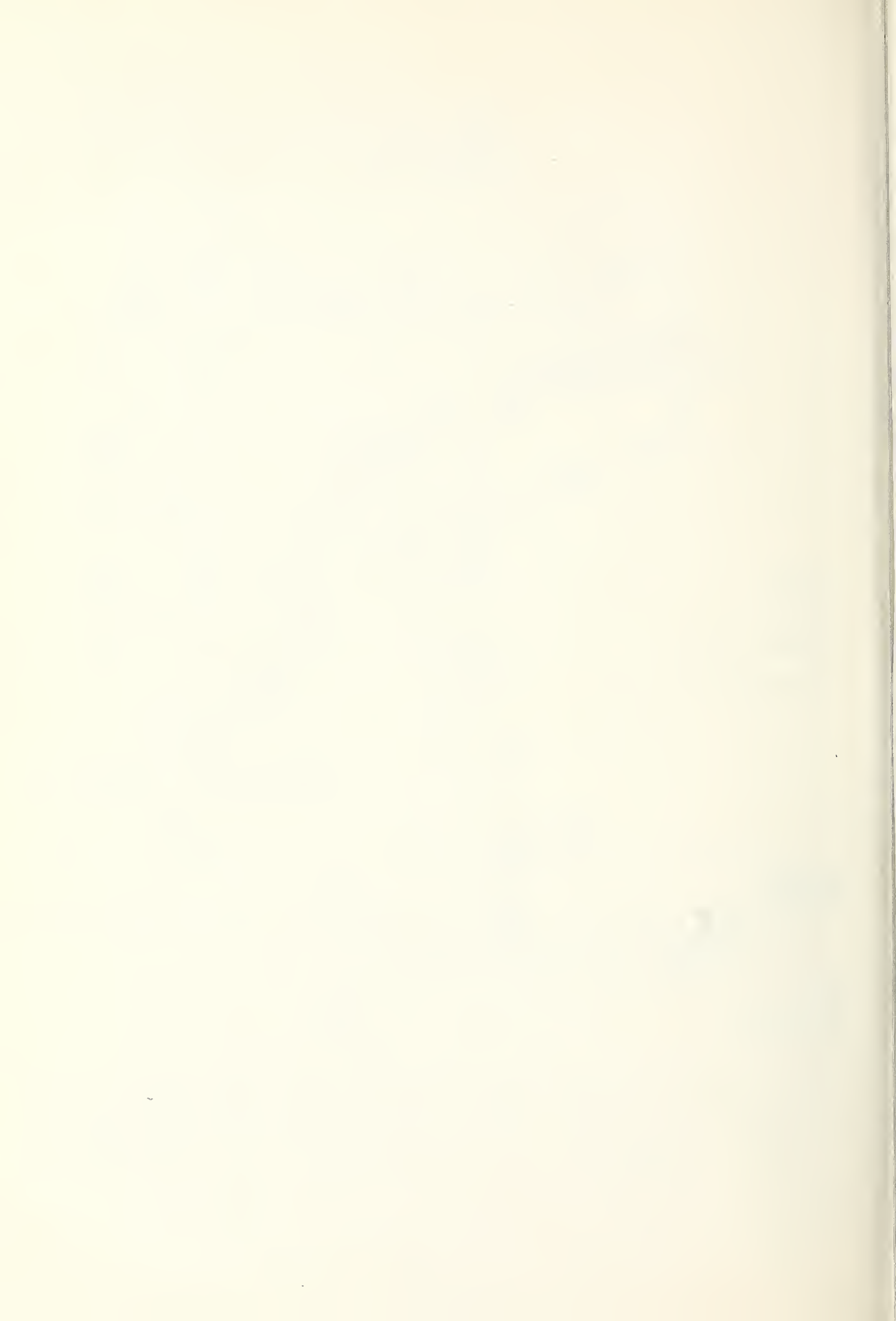
FIGURE #18



SAMPLE CAMP LAYOUT

XXX SHIFT FLOW





FIRE CAMP KITCHEN

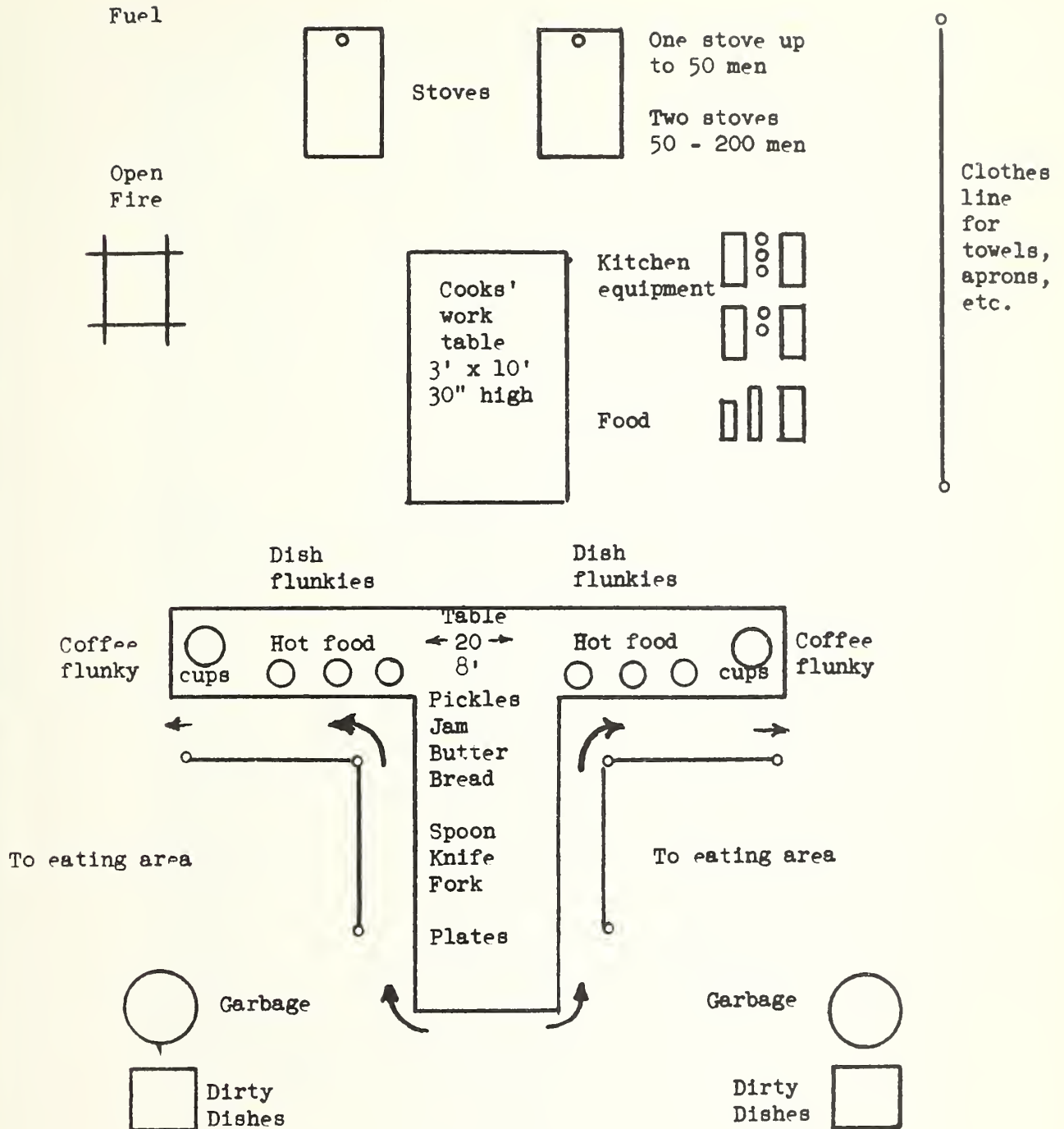


FIGURE #19

FIRE CAMP GROCERY ORDER

Order by Code Number and Quantity only, to save Radio time.

Code	Amt.	Item	50-Man Needs	Unit	Code	Amt.	Item	50-Man Needs	Unit
1		Bacon	30	Lb.	57		Pineapple Juice	1	Case
2		Butter	10	Lb.	58		Beans	10	Lb.
3		Ham	40	Lb.	59		Coffee	15	Lb.
4		Cheese	12	Lb.	60		Flour	10	Lb.
5		Beef	60	Lb.	61		Flour, pancake	10	Lb.
6		Beef, roast		Lb.	62		Macaroni	3	Lb.
7		Beef, steak		Lb.	63		Milk, canned	$\frac{1}{2}$	Case
8		Hamburger	30	Lb.	64		Oil, salad	1	Qt.
9		Wieners	25	Doz.	65		Peanut Butter		Qt.
10		Lunch Meat	10	Lb.	66		Rice	6	Lb.
11		Milk, fresh	50	Qt.	67		Sugar	20	Lb.
12		Shortening	6	Lb.	68		Syrup	2	Qt.
13		Oleo	10	Lb.	69		Tea	1	Lb.
		Margarine							
14		Eggs	15	Doz.	70		Bread	50	Loaf
15		Pork	60	Lb.	71		Doughnuts	8	Doz.
16		Sausage	25	Lb.	72		Cookies	20	Lb.
17		Cabbage	10	Lb.	73		Ice Cream		
18		Cantaloupes	25	Ea.	74		Pie	14	Ea.
19		Carrots	10	Lb.	75		Catsup	6	Btl.
20		Celery		Bu.	76		Extract		Pt.
21		Lettuce	20	Hd.	77		Mayonnaise	1	Qt.
22		Onions	10	Lb.	78		Mustard	1	Pt.
23		Potatoes	50	Lb.	79		Pepper	4	Oz.
24		Tomatoes	24	Lb.	80		Pickles, Sweet	2	Qt.
25		Turnips	5	Lb.	81		Pickles, Sour	2	Qt.
26		Watermelons		Ea.	82		Pickles, Dill	2	Qt.
27		Apples	1	Box	83		Salt	10	Lb.
28		Bananas		Lb.	84		Sauce, Chili		Btl.
29		Grapefruit	$\frac{1}{2}$	Crate	85		Sauce, Tomato		Can
30		Grapes	2	Lug	86		Sauce, Worcestershire		Btl.
31		Lemons	$\frac{1}{2}$	Crate			Vinegar	1	Qt.
32		Peaches	2	Lug	87				
33		Prunes	1	Box	88		Chloride of Lime	5	Can
34		Oranges	1	Box	89		Chlorox	$\frac{1}{2}$	Gal.
35		Asparagus	$\frac{1}{2}$	Case	90		Chore Boy	4	Ea.
36		Beans, Pork &	$\frac{1}{2}$	Case	91		Cleanser, Dutch	3	Can
37		Beans, String	$\frac{1}{2}$	Case	92		Corn Starch		Box
38		Beets	$\frac{1}{2}$	Case	93		Cups, Paper	200	Ea.
39		Carrots	$\frac{1}{2}$	Case	94		Matches	$\frac{1}{2}$	Ctn.
40		Corn	$\frac{1}{2}$	Case	95		Plates, Paper	200	Ea.
41		Hominy	$\frac{1}{2}$	Case	96		Bags, Paper #8	C	C
42		Peas	$\frac{1}{2}$	Case	97		Spoons, Wood	200	Ea.
43		Sauerkraut	$\frac{1}{2}$	Case	98		Forks, Wood	200	Ea.
44		Tomatoes	$\frac{1}{2}$	Case	99		Paper, Toilet	6	Roll
45		Apricots	$\frac{1}{2}$	Case	100		Powder, Baking	$\frac{1}{2}$	Lb.
46		Figs	$\frac{1}{2}$	Case	101		Soap, Laundry	2	Box
47		Fruit	$\frac{1}{2}$	Case	102		Soap, Powder		Case
		Cocktail		Case	103		Soap, Detergent	2	Pkg.
48		Jam	$\frac{1}{2}$	Case	104		Soap, Toilet	10	Bar

FIRE CAMP GROCERY ORDER (CONT'D)

Code	Amt.	Item	50-Man Needs	Unit	Code	Amt.	Item	50-Man Needs	Unit
49		Jelly		Case	105		Soda	1	Box
50		Peaches	$\frac{1}{2}$	Case	106		Towels, Dish	20	Pa.
51		Pears	$\frac{1}{2}$	Case	107		Towels, Paper	5	100
52		Pineapple	$\frac{1}{2}$	Case	108		Ice	400	Lb.
53		Blended			109		Wax Paper	2	Roll
		Juice	1	Case	110		Flamo	2	Tank
54		Grapefruit							
		Juice	1	Case					
55		Orange juice	1	Case					
56		Tomato juice	1	Case					

FIRE CREW MENU

Breakfast

Time Required to Prepare: (not determined)

Menu	Market List	25 Servings	50 Servings	100 Servings	150 Servings	Remarks
Grapefruit	Grapefruit Canned	2 #10	3 #10	6 #10	8 #10	3/4 c.-1 serving
Bacon & Eggs	Bacon	5 lbs.	10 lbs.	20 lbs.	30 lbs.	3 sls. per person, 15 slices per lb.
	Eggs	6 doz.	12 doz.	24 doz.	36 doz.	3 eggs per person
	Salt	2 lb.box	2 lb. box	2 lb.box	2 lb.box	May use fresh
	Pepper	4 oz.can	4 oz. can	4 oz.can	4 oz.can	
	Milk	5 cans	9 cans	18 cans	27 cans	
Raw Fried Potatoes or Hashed Brown	Potatoes	10 lbs.	20 lbs.	40 lbs.	60 lbs.	
	Fat					1 qt. 25 eggs Based on 1 C dice per serving. Use fat from above bacon.
Bread	Bread	4 lvs.	8 lvs.	16 lvs.	24 lvs.	1 1/2 lb.loaves 24 sls. to lf. 4 sls. person
Butter	Butter	2 lbs.	3 lbs.	5 lbs.	10 lbs.	Size & No. of can depends on weight
Jam	Jam	2 lbs.	4 lbs.	8 lbs.	12 lbs.	
Coffee	Coffee	1 lb.	2 lbs.	4 lbs.	6 lbs.	Based on 50 C
Milk	Milk-Coffee	2 cans	4 cans	8 cans	12 cans	to 1 lb.
Sugar	Sugar	8 oz.	1 lb.	2 lbs.	3 lbs.	Based on war rations 2 t. per man per meal

FIRE CREW MENU

*Menu	Market List	Cold Lunch				Remarks
		25 Servings	50 Servings	100 Servings	150 Servings	
Meat Sandwich	Meat Butter Bread	2 lbs. 1/8 lb. 2 lvs.	4 lbs. 1/4 lb. 4 lvs.	8 lbs. 1/2 lb. 8 lvs.	12 lbs. 3/4 lb. 12 lvs.	Net weight 1 1/2 lvs.-24 sls.per lf.
Cheese Sandwich	Cheese Cream or Can Milk Salt Cayenne Butter Bread	1 1/2 lbs. 1/2 pt. 1 can 1/8 lb. 2 lvs.	3 lbs. 1 pt. 2 cans 1/4 lb. 4 lvs.	6 lbs. 1 qt. 4 cans 1/2 lb. 8 lvs.	9 lbs. 1 1/2 qts. 6 cans 3/4 lb. 12 lvs.	American Chs crumbled or grated To taste
Jam Sandwich	Jam Bread	2 lbs. 2 lvs.	4 lbs. 4 lvs.	8 lbs. 8 lvs.	12 lbs. 12 lvs.	
Orange or Apple	Oranges	2 1/2 doz.	4 1/2 doz.	8 1/2 doz.	12 1/2 doz.	
Substitute Sandwich Filling Scrambled Eggs Sandwich Spread	Eggs Meat Dill Pickles Mayonnaise Salad Dress. (Miracle Whip)	2 doz. 1 lb. 1/2 lb. 1/2 lb. 	4 doz. 2 lbs. 1 lb. 1 lb. 	8 doz. 4 lbs. 2 lbs. 2 lbs. 	10 doz. 6 lbs. 3 lbs. 3 lbs. 	 Grind after cooked Chop fine Mix thor- oughly with above

Lunch will consist of 3 sandwiches and an orange or apple. Substitution should be made if meat, cheese or jam is not available.

FIRE CREW MENU

Hot Lunch

Time Required to Prepare: 1 hour (if sandwich meat cooked)

Menu	Market List	25 Servings	50 Servings	100 Servings	150 Servings	Remarks
Veg. Milk	Potatoes	2½ lbs.	5 lbs.	10 lbs.	15 lbs.	Servings about 1 C per person 6 med. to lb.
	Onions	1 lbs.	2 lbs.	4 lbs.	6 lbs.	
	Celery	6 stalks	12 stalks	24 stalks	36 stalks	
	Carrots					
	Fresh or	2 lbs.	4 lbs.	8 lbs.	12 lbs.	
	Canned	1 #2	2 #2	1 #10		
	Canned corn	3 #2	3 #2	12 #2	15 #2	(or 2 #10 & 2 #2
	Bacon	½ lb.	1 lb.	2 lbs.	3 lbs.	or same amt. of dried beef and twice amt. of ham or butter
	Milk	4 qts.	8 qts.	12 qts.	16 qts.	
	Flour	1 lb.	1 lb.	2 lbs.	3 lbs.	
Cheese Sandwiches	Salt	1 box	1 box	1 box	1 box	
	Pepper	1 box	1 box	1 box	1 box	
	Cheese	1½ lbs.	3 lbs.	6 lbs.	9 lbs.	American Chs.
	Cream or	½ pt.	1 pt.	1 qt.	1½ qts.	
	Canned milk	1 can	2 cans	4 cans	6 cans	
	Salt					To taste
	Cayenne					Optional
	Butter	1/8 lb.	¼ lb.	½ lb.	¾ lb.	
	Bread	2 lvs.	4 lvs.	8 lvs.	12 lvs.	1½# lvs.--24 sls. per loaf
	Meat	2 lbs.	4 lbs.	8 lbs.	12 lbs.	Must be this weight after boiled-baked & boned. Grind
Meat Sandwiches	Eggs	2 eggs	4 eggs	8 eggs	10 eggs	May omit eggs, but increase meat according ly
	Celery	2 stalks	4 stalks	8 stalks	12 stalks	-(subst.lettuc e
	Pickles	¼ lb.	½ lb.	1 lb.	1½ lb.	If available
	Vinegar	¼ cup	½ cup	½ pint	¾ pt.	
	Salad dress.	1 pt.	1 qt.	2 qts.	3 qts.	
	Salt					Use to taste
	Bread	2 lvs.	4 lvs.	8 lvs.	12 lvs.	1½# lvs.--24 slices per lf.
						May use hard- cooked eggs instead of meat, if de- sired
	Tomato juice or grapefruit	2 #10	4 #10	8 #10	12 #10	1 C/serving
	juice or					
Coffee Milk Sugar	Coffee	2 lbs.	4 lbs.	8 lbs.	12 lbs.	50 C per lb.
	Milk	3 cans	6 cans	10 cans	16 cans	
	Sugar	2 lbs.	4 lbs.	8 lbs.	10 lbs.	

FIRE CREW MENU
Dinner or Supper

Time Required to Prepare: 1 hour if meat ground; 2 hours if meat in cubes.

Menu	Market List	25 Servings	50 Servings	100 Servings	150 Servings	Remarks
Meat and Vegetable Stew	Beef Flour Fat	8 lbs. 1 lbs. 1 lb.	15 lbs. 1 lb. 2 lbs.	25 lbs. 2 lbs. 3 lbs.	40 lbs. 2 lbs. 4 lbs.	Meat should be pounded before cutting. Cut in 1" cubes, or ground.
Based on $\frac{1}{2}$ C. per serving	Carrots Onions Celery Turnips Potatoes Peas Tomatoes Salt Pepper Celery Salt	2 $\frac{1}{2}$ lbs. 1 lbs. 1 bch. 1 $\frac{1}{2}$ lb. 4 lbs. 1 #2 can 1 #2 $\frac{1}{2}$ can 2-lb. can 8 oz. can 2 oz. btl.	5 lbs. 2 lbs. 2 bchs. 3 lbs. 8 lbs. 2 #2 cans 2 #2 $\frac{1}{2}$ cans 2-lb. can 8 oz. can 2 oz. btl.	10 lbs. 4 lbs. 4 bchs. 6 lbs. 16 lbs. 1 #10 cans 1 #10 cans 2-lb. can 8 oz. can 2 oz. btl.	15 lbs. 6 lbs. 4 bchs. 9 lbs. 24 lbs. 1 #10 & 2 #2 1 #10 & 2 #2 $\frac{1}{2}$ 2-lb. can 8 oz. can 2 oz. btl.	Use instead of celery if desired 3/4 C. 1 C. serving May substitute peaches 1 $\frac{1}{2}$ lb. loaves 4 sls. person; 24 st. to loaf No. of cans depends on wt. 50 Cs.-1 lb. Based on war ration quota- 2 t per man per meal
Cabbage and Carrot Slaw	Cabbage Carrots onion Salad Dressing	3 $\frac{1}{2}$ lbs. 2 lbs. $\frac{1}{2}$ lb. 1 pt.	8 lbs. 4 lbs. 1 lb. 1 qt.	12 lbs. 6 lbs. 2 lbs. 2 qts.	25 lbs. 8 lbs. 3 lbs. 3 qts.	
Prunes	Prunes	2 #10 cans	4 #10 cans	7 #10 cans	11 #10 cans	
Bread	Bread	4 loaves	8 loaves	15 loaves	24 loaves	
Butter	Butter	2 lbs.	3 lbs.	6 lbs.	10 lbs.	
Apple butter	Apple Butter	2 lbs.	4 lbs.	8 lbs.	12 lbs.	
Coffee	Coffee	1 lbs.	2 lbs.	4 lbs.	6 lbs.	
Milk	Milk	2 cans	4 cans	8 cans	12 cans	
Sugar	Sugar	8 oz.	1 lb.	2 lbs.	3 lbs.	

FIRE CREW MENU
Dinner or Supper
Time Required to Prepare: 1 hour

Menu	Market List	25 Servings	50 Servings	100 Servings	150 Servings	Remarks
Beef	Beef (grnd.)	6 lbs.	12 lbs.	24 lbs.	36 lbs.	Based on 2C
Butter	Butter	$\frac{1}{4}$ lb.	$\frac{1}{2}$ lb.	$\frac{1}{2}$ lb.	1 lb.	per person
Onions	Onions	$1\frac{1}{2}$ lb.	3 lbs.	6 lbs.	9 lbs.	
Spaghetti	Spaghetti	$1\frac{1}{2}$ lb.	3 lbs.	6 lbs.	9 lbs.	
Tomatoes	Tomatoes	5 #2 $\frac{1}{2}$ cans	3 #10 cans	6 #10 cans	9 #10 cans	*1
Peas	Peas	5 #2 cans	2 #10 cans	4 #10 cans	6 #10 cans	
Pimentos	Pimentos	3 cans	6 cans	9 cans	15 cans (small)	
*2 Olives,ripe	*2 Olives,ripe	2 #1 cans	4 #1 cans	8 #1 cans	12 #1 cans (optional)	
Cheese	Cheese	2 $\frac{1}{2}$ lbs.	5 lbs.	10 lbs.	15 lbs.	
Corn	Corn	3 #2 cans	6 #2 cans	12 #2 cans	18 #2 cans	Note: Amount
Salt	Salt	1 box	1 box	1 box	1 box	for 25 yields
Pepper	Pepper	1 can	1 can	1 can	1 can	15 qts.
Cornflakes	Cornflakes	1 pkg.	1 pkg.	1 pkg.	1 pkg.	
Carrots, raw	Carrots, raw	2 $\frac{1}{2}$ lbs.	5 lbs.	10 lbs.	15 lbs.	
Carrots, can	Carrots, can	1 #10 can	2 #10 cans	4 #10 cans	6 #10 cans	
Pickles or relish	Pickles or relish	2 qts.	1 #10 can	2 #10 cans	3 #10 cans	
Peaches sliced	Peaches sliced	2 #10 cans	4 #10 cans	8 #10 cans	12 #10 cans	
Cookies or	Cookies or	5 doz.	10 doz.	20 doz.	30 doz.	
Graham crax	Graham crax					
Bread	Bread	4 loaves	8 loaves	16 loaves	24 loaves	4 sl. person 1 $\frac{1}{2}$ lb. loaf 24 sl. per lf.
Butter	Butter	2 lbs.	3 lbs.	6 lbs.	9 lbs.	
Jam	Jam	2 lbs.	4 lbs.	8 lbs.	12 lbs.	
Coffee	Coffee	1 lbs.	2 lbs.	4 lbs.	6 lbs.	50 C-1 lb.
Milk	Milk	2 cans	4 cans	8 cans	12 cans	
Sugar	Sugar	2 t. per man-8 oz.	1 lb.	2 lbs.	3 lbs.	

- 1 When #10 cans are not available, use 3 #2 $\frac{1}{2}$ cans.
2 Olives add to appearance--but are an expensive addition.

Rationing for Sugar:
2 t. per meal--1 c. per 25 serv.
2 1/3 T. per day per man--
8 oz. per week.



